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TRADE, COMPETITIVENESS AND THE ENVIRONMENT

Prepared for
Canadian Council of Ministers of the Environment (CCME)
by
Centre for Trade Policy and Law
and
Institute for Research on Public Policy
July 1993

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INTRODUCTION

Trade and environment issues have risen rapidly to the top of the international agenda. The Prime Minister, in his speech in Hull three days before the Earth Summit, pledged Canada's support for a new round of GATT with the environment as its "focal point" which would follow the current Uruguay Round of negotiations. The GATT Working Group on Environmental Measures and International Trade, established more than 20 years ago, has finally begun to meet regularly. Many of the speeches of the heads of state at the Earth Summit in Rio de Janeiro referred to the intimate relationship between trade liberalization and environmental improvements in developing countries. The World Bank, the Organisation for Economic Co-operation and Development (OECD), the United Nations Conference on Trade and Development (UNCTAD) and a number of academic institutions have begun active programs of research into these areas.

These and other developments have contributed to a series of discussions about the relationship between environmental standards and the ability of Canadian industry to compete internationally. The reaction of the pulp and paper industry to the recent British Columbia government proposals to effectively ban the use of chlorine in the paper making process is the most recent example of the concern of some industries that tighter environmental standards will make them uncompetitive.[1] To the extent that these issues have been discussed in the current round of consultations on the federal government's "Prosperity" initiative, there seems to be a widespread sense that competitiveness and environmental standards are usually enemies.

There is, however, a small but growing body of theoretical and policy-oriented knowledge that suggests that trade policy and environmental policy can act as complements in the development of conditions within which firms can innovate and become more internationally competitive. Drawing on the work of Michael Porter[2], a number of writers maintain that companies which operate within tough domestic regulatory environments are often the most able to compete internationally.

It is within this context that this paper addresses the links between trade, competitiveness and the environment. In particular, this study examines ways in which environmental protection measures can enhance trade performance and competitiveness, or at least minimize potential adverse effects.

The study has five sections. The first section focuses on defining the interrelationships between trade and competitiveness and developing a theoretical approach to help explain the impact of these interrelationships and how their influence changes over time. This approach is based on the business strategy literature (and particularly that of Michael Porter), strategic trade theory, and current thinking about sustainable development.

The second section is an assessment of the effects of environmental policies on trade. Topics discussed include the costs of environmental protection, the impact of "green" consumerism, and the increasing importance of international treaties and conventions.

The third section examines the issue from a trade policy and competitiveness perspective, analyzing the possible direct and indirect environmental impacts of trade agreements. This includes a discussion of the interpretation of trade rules through dispute settlement processes, which can lead to certain environmental regulations being deemed non-tariff barriers to trade.

The fourth section then takes what has been concluded from the previous three sections and tests the assertions against three sectoral studies: forest products, packaging and energy. Given the substantial menu of measures and the limited scope of this study, those environmental measures that are discussed in these sectoral studies have been chosen to best illustrate the interrelationships between trade, competitiveness and environmental policy.

From these examples, we make broader statements in the final section about these interrelationships. This includes a discussion of possible changes in environmental measures to ensure that they continue to protect the environment without becoming protectionist; possible changes in trade policies to make them more consistent with sustainable development; and possible measures to reconcile environmental and trade concerns within GATT and the NAFTA.

1 DEFINING RELATIONSHIPS BETWEEN TRADE, COMPETITIVENESS AND THE ENVIRONMENT

The classical approach to understanding why countries trade is based on the theory of comparative advantage: countries trade to exploit relative cost efficiencies. One version of this model focuses on relative factor endowments, or the differences between countries according to their relative supply of factors of production (i.e., land, labor, infrastructure, natural resources and capital).

Critics argue that this static analysis has limited explanatory value in a world of dynamic change. Much of world trade now takes place between countries with very similar factor endowments; indeed, many goods and services require similar factor proportions, regardless of the location in which they are produced or are available. Many countries have now achieved a level of economic development that can support a wide range of industries and services. It is also evident that the level of relative competitiveness of a particular national economy can and frequently does change over time. These empirical observations have led to the development of theoretical economic analysis of strategic trade and industrial policies which focus on the role of economies of scale and the dynamics of technological innovation as additional sources of gains from trade beyond differences in resource and labor endowments.

These developments have led many to suggest that there is a systemic or national economy aspect to the comparative advantage equation, what Michael Porter has referred to as "the competitive advantage of nations." Moreover, over the longer term, what is critical is sustained competitive advantage of a number of firms and supporting industries within an economy. These advantages are sustained by strategies based on rapid improvement and innovation, the anticipation of both international and domestic needs, and the relentless broadening and upgrading of increasingly sophisticated products and services. Competitiveness, therefore, is part of a constantly evolving process of change. Firms, and indeed, national economies, can compete in this environment if their culture, institutions and economic structures are so disposed.

An appropriate government strategy for the promotion of sustained competitive advantage, Michael Porter argues, is not simply a choice between laissez-faire or direct intervention in industry; rather, the role of government is more subtle and, at the same time, more complex:

> The proper role of government is to improve the quality of inputs (factors) firms can draw upon, and define a competitive environment and rules of the game that promote upgrading. Government plays an important part in shaping the pressures, incentives, and capabilities of a nation's firms.
>
> Government's role is inherently partial, and succeeds only when working in tandem with favourable underlying conditions...[within the economy]. Government policies that succeed are those that create an environment in which companies can gain competitive advantage rather than those that involve government directly in the process. Its appropriate role is an indirect, rather than direct, one. Government's proper role is as a catalyst and challenger. It is to encourage, or even push, companies to raise their aspirations and move to higher levels of competitive performance, even though this process may be unpleasant and difficult. Government's job is to make firms feel wanted but uncomfortable and in need of improvement, not to forge cozy business-government "partnerships," relax pressures on industry, or seek to eliminate risks.[3]

Government policy has a role in challenging firms in instances where, for reasons of corporate culture and/or because of logical business responses to previous government policies, they are not responding to competitiveness conditions as well as they should. Standards and regulations, therefore, can be used to foster innovation and the development of internationally competitive products and services. Likewise, the same could be said about market-based instruments which, when in place, are expected to provide an array of economic choices (versus imposed product and process standards, technology or capital investments) that will eventually effect behavioral changes.

Moreover, governments have a responsibility in ensuring that the necessary factor and demand conditions (e.g., skills, education, demand conditions) exist so firms can exploit the advantages of producing in that economy. Finally, competitive conditions change over time, and that governments have to work with business in assessing its role at different points in time.

Clearly, some caution has to be observed in applying these principles to a specific situation. For example, in order for stringent government regulations to assist international competitiveness, these regulations would have to correctly anticipate international environmental trends. Furthermore, the larger a country's domestic market, the more influence its policy makers will have on international environmental trends since other countries will want to ensure their ability to sell into that market. However, this new model, which draws linkages between regulations and competitiveness through resource efficiency and productivity, has been supported by many studies which identify innovation, new products and cost savings as sources of competitiveness. Like Porter, the United Nations Economic Commission for Latin America and the Caribbean (ECLA) noted that the ability to compete in international markets lies in the capability to incorporate technological progress and disseminate it through the system of production of goods and services.[4] The Office of Technology Assessment of the U.S. Congress has observed how American firms have exercised leadership in process improvements and technology which have reduced competitive disadvantage and increased competitive advantage in an environment of regulations.[5] The sale of environmental products and services also provides a means to remain competitive.[6] Finally, the Government of Canada stresses that the ability to remain competitive in global markets depends crucially on exploring every avenue for new, cost-effective and innovative solutions. In its latest

study of economic instruments,[7] it was suggested that economic instruments represent just such an avenue.

Further endorsement of this model is embodied in a statement by the General Agreement on Tariffs and Trade (GATT) itself. In its annual report[8] the GATT agreed with the argument that regulations will lead initially to declining competitiveness. However, it also made clear that such competitiveness will rise thereafter, thereby projecting a "J curve". This has been attributed to the fact that technical changes, innovation and investments adopted now as a consequence of stringent environmental policies inevitably allow affected companies to place themselves in a more competitive position in the future.

A Environmental Standards and Sustained Competitive Advantage

Looking around the globe, a strong case can be made that stringent environmental standards can have a positive effect on international competitiveness. World export leaders, Germany and Japan, for example, both have tougher environmental regimes than both Canada and the United States, and yet, both continue to surpass these two North American countries in terms of productivity growth in manufacturing and for the economy as a whole.

More specifically, Germany has arguably the world's tightest regulations in stationary air-pollution control, and German companies appear to hold a wide lead in patenting and exporting air-pollution and other environmental technologies.[9] The Americans are export leaders in pesticides, other chemicals, plastics, synthetics, fabrics and paints -- areas where U.S. regulations have been the strictest. In contrast, the U.S. auto industry continues to fight mandates to increase fuel efficiency, and the U.S. government continues to maintain very low gasoline prices, while the auto industry's competitors continue to innovate and lead under a much tighter regulatory environment. Perhaps even more revealing, Britain, which has allowed its environmental standards to slip over recent years, has seen its ratio of exports to imports in environmental technology fall from 8:1 to 1:1 over the past decade.

Consider the range of possible outcomes for a jurisdiction in setting a new environmental standard which is to be implemented in five years. What will be the longer term effects on the competitive position of firms in the jurisdiction?

The Payback Scenario - In this situation the industry/firm finds that it can develop innovative production methods or products which partially, fully or more than offset the cost of compliance. For example, the oil price shocks induced firms to develop technology that was more cost-effective and less energy-intensive even as real energy prices subsequently declined. If the cost offset from induced innovation is partial, but domestic and foreign consumers are prepared to pay a premium for the higher quality "greener" product, these factors together may compensate for the higher costs. Under this benign scenario, innovation and investment costs are recovered from normal tax incentives, cost reductions, and the market premium obtained from "getting there early".

The Cost-Recovery Scenario - Under this scenario, the environmental regulation imposes net costs on the firm, but the firm is able to recoup the costs as a result of current or future mandatory regulation of products in the domestic market and export markets.

Firms may gain temporary or sustained competitive advantage if the domestic regulatory environment correctly forecasts the emerging regulatory regime in export markets.

The No-Regulation Scenario - Firms which seek to defer compliance may avoid short term costs of regulatory compliance, but may lag in developing or adopting new technologies which impairs longer-term competitiveness while facing green protectionism.

Backing-the-Wrong-Horse Scenario - If technological innovation does not yield cost offsets and if export markets follow a different regulatory approach than the home jurisdiction, then Canadian-based firms may encounter both competitive problems and green protectionism obstacles.

In any particular case, it is difficult to predict the outcome in advance. However, the size of the home market influences the capability of regulators to pursue an aggressive unilateral policy under scenarios other than the Payback Scenario. For example, California can pursue more aggressive unilateral policies than a Canadian province because it has a large market. Thus, there are advantages to the competitive position of Canadian industries, or the costs of compliance are minimized, if Canadian provinces pursue compatible policies for environmental regulation. In addition, if Canadian regulators correctly anticipate how environmental regulation is evolving in Canada's major trading partners, then this will stimulate innovation which could enhance competitiveness in the longer term.

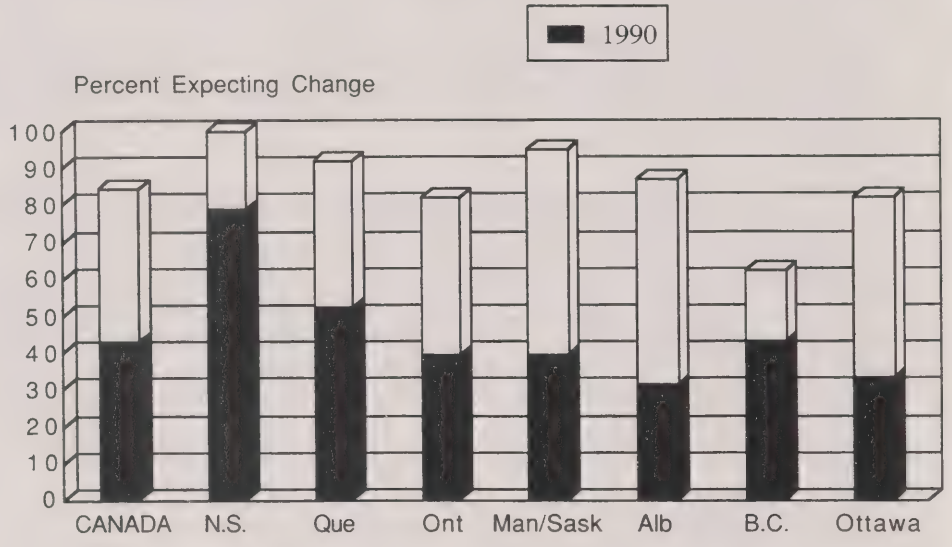
B Business Strategies and Environmental Policy

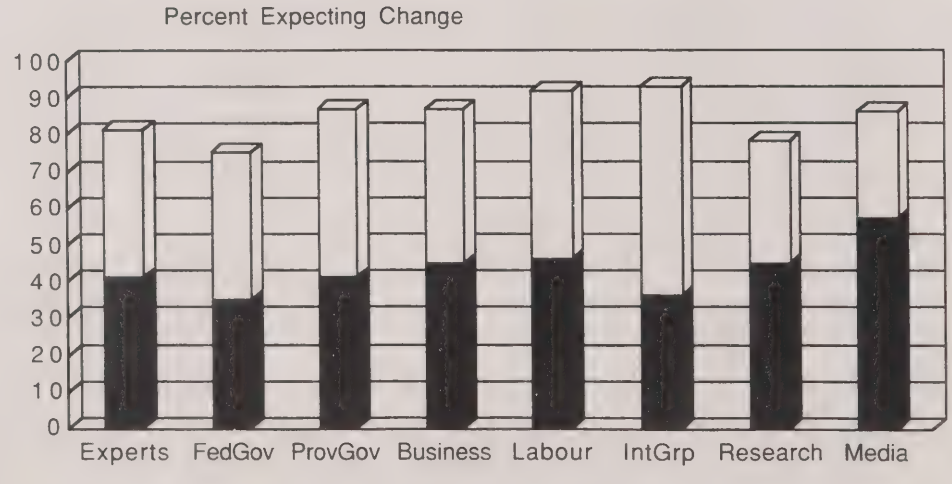
In 1991, McKinsey & Company conducted a survey of business attitudes on environmental issues.[10] Four hundred senior executives, 28 per cent of which were from companies with sales over $5 billion, responded to the survey.[11] The results of the survey indicated a strong, but predictable, focus on issues of particular interest to business. For example, there was a fairly widespread perception among respondents that environmental measures involve costs that cannot always be passed on to the consumer. Nevertheless, 76 per cent of respondents agreed that spending on environmental research and development will give their companies a long-term competitive advantage.

The results of the survey also indicated strong support for a more predictable and stable environmental regulatory regime across regions and countries. Among respondents, 74 per cent agreed that their competitive position would be negatively affected by a lack of international harmonization of standards, and 67 per cent agreed that such harmonization would benefit their companies.

At the same time, businesses are attempting to anticipate government actions and changing market conditions, and are then building their business strategies around their assumptions about future consumer behavior and government policy. Among the respondents, 92 per cent agreed that the environmental challenge is one of the central issues of the 21st century, while 75 per cent of respondents further agreed that strong corporate environmental responsibility and a strong corporate commitment to the environment are critical to overall business strategy. Moreover, in anticipation of future government policies, the majority of respondents said they expected levels of pollution permitted under current legislation to be reduced by up to 50 per cent by the year 2000.

Forecast:	Greater concern for the environment will lead many Canadians to significantly change their lifestyles and consumption patterns.

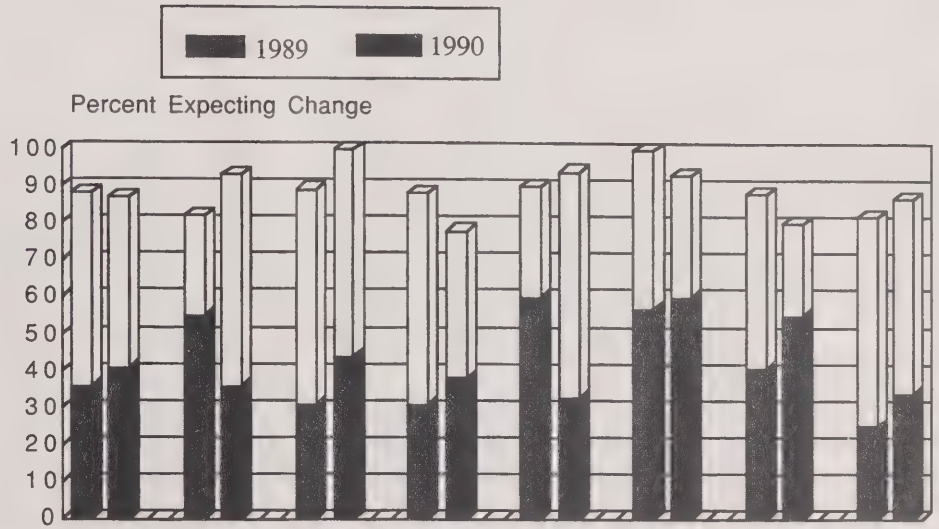


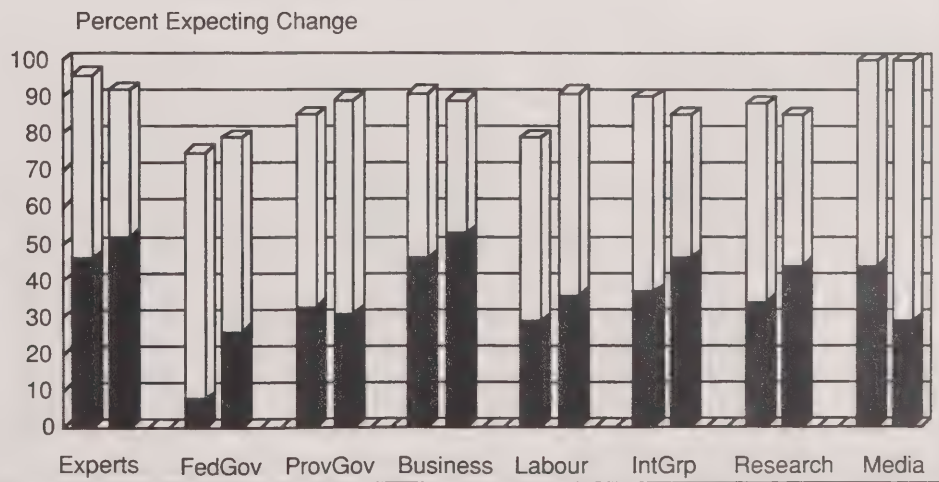


Lower portion of each bar is the percent who expect significamt change **Within 5 Years**; the Upper portion is the percent who expect the change **In 5 to 10 Years**.

Note: The above charts were re-produced with permission from Hay Management Consultants Limited, Toronto, Ontario.

Forecast:	Sustainable development concepts will significantly change long-term planning for economic growth, in order to minimize environmental harm.

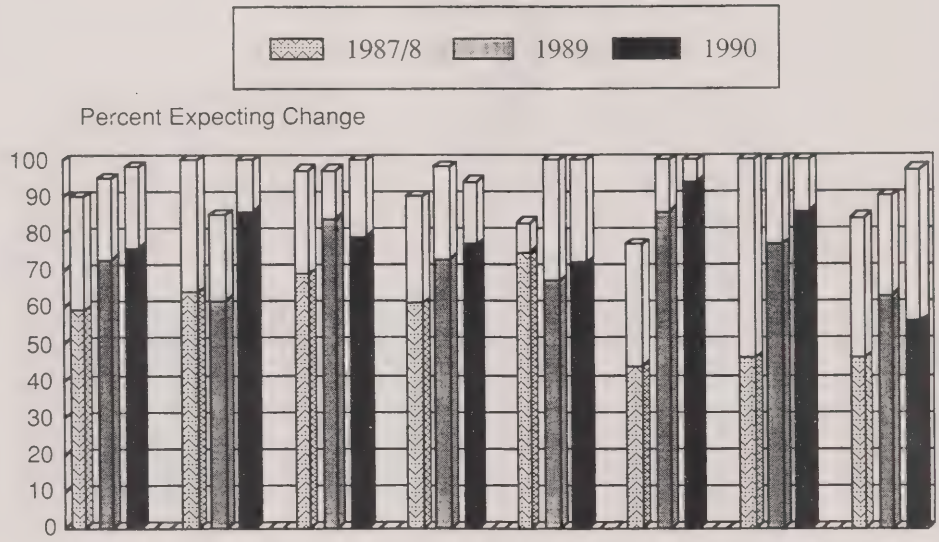


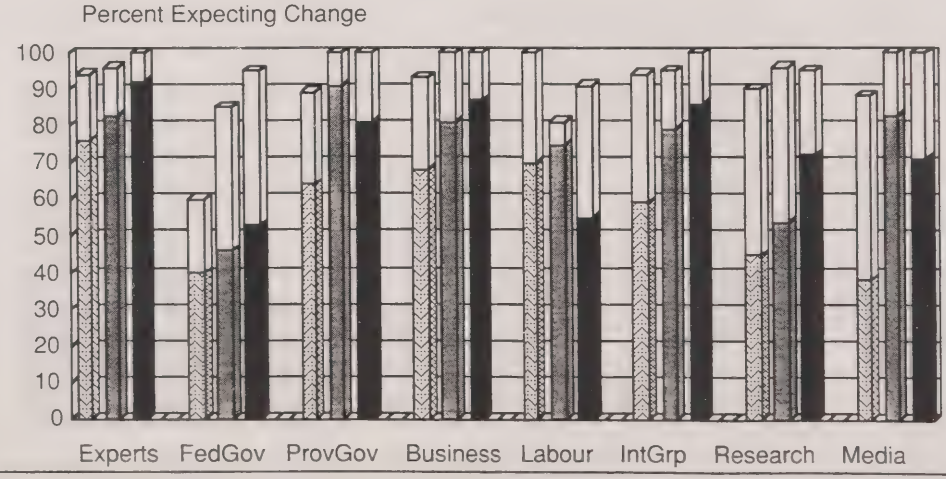


Lower portion of each bar is the percent who expect significant change **Within 5 Years**; the Upper portion is the percent who expect the change **In 5 to 10 Years**

Note: The above charts were re-produced with permission from Hay Management Consultants Limited, Toronto, Ontario.

Forecast:	Much stronger environmental protection regulations will be applied to Canadian companies.





Lower portion of each bar is the percent who expect significant change **Within 5 Years**; the Upper portion is the percent who expect the change **In 5 to 10 Years**.

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These international results were reflected to some extent in a recent study of opinion leaders in Canada by the Hay Group.[12] As the accompanying charts demonstrate,[13] an overwhelming majority of Canadian business leaders anticipate that they will be facing much stronger environmental protection regulations over the next few years. There is also general agreement that sustainable development will require major changes in long term planning for economic growth. Note that these businesses are much more likely to factor new regulations into their thinking than are federal government officials or labor leaders, two of the other key players.

In a sense, therefore, industry leaders reflect the strong underlying sentiment of the public in most of the OECD countries that the environment will remain a prominent part of the public policy agenda for the foreseeable future. Despite their public posturing whenever regulations are introduced or strengthened, most executives have built environmental considerations into their long term planning. Many have done so in the expectation that their companies will be more competitive in the next century as a result.

2 THE IMPACT OF ENVIRONMENTAL POLICIES ON TRADE

There are a number of ways in which environmental policies can influence trade flows. By compelling the internalization of external costs, such policies may cause regulated firms to become less competitive relative to foreign competitors, or even induce firms to escape the high costs of compliance by migrating to areas where environmental standards are less strict or weakly enforced. On the other hand, there are cases where strict environmental regulation leads to innovation, efficiency, and ultimately, greater competitiveness.

The growing trend toward green consumerism in Canada and Western Europe may also have significant trade impacts, especially if it expresses itself in consumer boycotts of products as well as enhanced government regulations.

Finally, as the preparations for the Rio Conference have demonstrated, there is a momentum toward global conventions to deal with problems of pollution of the global commons. The Convention on International Trade in Endangered Species (CITES) in 1975 was the first major international environmental agreement containing trade provisions. It was followed by the Montreal Protocol On Substances That Deplete the Ozone Layer. The Rio process has produced the Framework Convention on Climate Change and the Convention on Biological Diversity, both of which are likely to have substantial effects on trade in services as well as goods.

A The Costs of Environmental Protection

While environmental regulatory regimes may be only one of many factors that affect the overall business strategies of firms, compliance with regulations and/or the adoption of market instruments can and does involve added costs. These costs can arise in the form of taxes, charges or penalties for pollution, the costs of the installation of required pollution control devices, changes in production processes and investments in other capital equipment. In some cases (e.g., environmental assessment on projects) regulatory delay can be an additional cost.

For industry as a whole, these added costs have not yet been significant. According to the OECD[14], total pollution control and abatement expenditures in the mid-1980s accounted for approximately 1.25 per cent of Canadian Gross Domestic Product (GDP). This compares with 1.47 per cent in the United States and 1.52 per cent in West Germany. The same OECD study calculates the total cost of these investments by the private sector in Canada as a percentage of total private sector investment at 1.52 per cent. This figure is also comparable with those of other countries.

More recently, Carl Sonnen of the Ottawa research firm Informetrica has attempted to quantify the cost of pollution control expenditures to the year 2000. In the inaugural issue of the magazine Ecodécision, he estimates that the costs of new actions over and above those provided in current legislation could reach $90 billion by the end of the decade:

> Current expenditures that follow from the investment would be equivalent to about 2 per cent of the country's expected Gross Domestic Product in the year 2000. In other words, the new environmental actions would divert about two per cent of the economy's resources from the production of food, clothing, education and health care to the production of clean air and water.[15]

While the cost to many industries will be manageable -- about 2.5 to 3.0 per cent of 1989 investment expenditures -- Sonnen points out that the burdens will fall hardest on many of Canada's traditional export industries. Here, the costs could rise to about 5 per cent or more of their normal income levels. The costs to households could also be high, consuming a quarter of the increase in household income throughout the decade. If the present high degree of public concern for the effects of the environment on human health continues, that level of individual expenditure should be politically sustainable.

In a later study, Sonnen and his colleagues attempted to cost out the implementation of the pollution control aspects of the Green Plan.[16] They estimate that households, businesses and municipal governments will need to spend almost $40 billion over the next decade in addition to what is already being spent to comply with existing regulations. Here again, the results are unevenly distributed with a number of sectors (non-metal mining, food processing, rubber products, plastics, leather goods, primary metals, and petroleum refining) forecasted to increase their environmental spending to ten per cent of total investments.

Both of these studies conclude that the overall impact of public and private sector environmental investment programs on the Canadian economy as a whole will be manageable. But many of Canada's traditional primary exporters will face the dual challenge of investing substantial resources to modernize their production facilities and reducing operating costs while also increasing their environmental expenses. Allocation of these costs will also raise a number of political problems, as they are likely to be unevenly distributed geographically.

There is anecdotal evidence that some primary producers in the United States, Europe and Japan moved their operations offshore when faced with similar challenges. In fact, some have stated that Japan's remarkable performance in increasing energy efficiency owes something to Japan's tendency to relocate many of its dirty and energy-intensive industries in other parts of Asia. Recently, much of the criticism of the NAFTA has centred on media and non-governmental organization (NGO) reports of dirty industries which have migrated to Mexico and settled in the maquiladora zone to take advantage of

lax enforcement of Mexican environmental regulations.[17] However, numerous studies performed in the 1980s (and more recently, by the World Bank) show that pollution abatement costs were minor factors in the decisions by firms to migrate. (This is discussed further in Section 4 on industry relocation and pollution haven arguments.)

While such costs have been found to be a modest percentage of operating and capital expenditures, it has also been noted that there is an underestimation of actual costs because estimations have tended to focus on pollution control costs and not the full costs which should be internalized and reflected in final prices. Furthermore, economic analysis conventionally considers only extraction costs of a resource but not its depletion which is a legitimate cost of production.[18] An in depth analysis of and recommendations on full cost pricing is beyond the scope of this report. However, this represents an area of study in which the CCME could play a useful role.

Another element that can frequently represent major costs to the firm is the multiplicity of national standards. Pressed hard by public opinion, governments everywhere are adopting a plethora of regulations and standards. In the absence of harmonization, firms may spend inordinate amounts of time and money complying with the regulations of several different jurisdictions. This is not only a problem internationally. It also arises in Canada, where environmental regulations affecting the pulp and paper industry, for example, can vary dramatically from one province to another.

B The Impact of Green Consumerism

Green consumerism is growing rapidly throughout the OECD countries. Recent European polls have shown that two-thirds of Germans would buy a less environmentally harmful product, even if it costs more. Three-quarters of consumers in the U.K., France and Germany strongly agreed that there should be detailed information on packaging, explaining environmental claims. Closer to home, a recently released study comparing attitudes in the United States, Mexico and Canada concluded that Canadians were the greenest North Americans, with more than three-quarters claiming to have changed their buying habits over the past year for environmental reasons.[19]

These figures are replicated throughout the developed world, and are leading to public demands for tougher regulations governing the content of pesticides and other substances in foods. One can call to mind the dispute between the United States and the European Community over the use of hormones in beef.[20] There are signs that this concern over health is spreading to non-food products as well. Recent moves in Western Europe to promote the use of chlorine free paper products may well result in new official standards.

In addition to concerns over public health (which all the pollsters tell us is the major factor underlying public environmental concerns), countries are also strengthening their packaging and recycling regulations. In the cases of Germany and the Netherlands, these new regulations could have significant impacts on Canadian and other exporters. (See Section IV(C.) for more details.)

Generally, such practices are consistent with the countries' rights and obligations as Contracting Parties to the GATT. As the GATT Secretariat makes clear in its recent annual report, any country has the right to "...protect its environment against damage from either domestic production or the consumption of domestically produced or

imported products. Generally speaking, a country can do anything to imports or exports that it does to its own products."[21]

It is when the importing country seeks to influence the environmental policies of another country that problems arise. This is done through trade measures like restrictions, bans and quotas which pressure exporting countries to change their domestic policies or practices to accommodate those of the importer. In the tuna/dolphin case, for example, the United States tried to force the Mexican tuna fleet to change its fishing practices by banning tuna imports from that country.[22] Although the GATT panel ruled against the United States in that case, U.S. environmental groups still seem determined to use trade measures to force changes in the policies of other countries. In the last Congress, more than 30 prospective bills contained provisions that would have placed environmentally-related trade restrictions on other countries' exports to the United States.[23]

While the trend toward official "unilateralism" of this kind is likely to grow, many fear that unofficial consumer-led boycotts will be the most prominent form of unilateralism in the future. Canadians do not need to be reminded of the effects of such boycotts. They effectively ended the East Coast seal hunt and have devastated the fur industry. More recently, pressure by consumers and environmental groups played a key role in the New York state government walking away from its commitments to buy power from the second phase of the James Bay hydroelectric project.

Many are concerned about a possible boycott of Canadian forest products by European environmentalists. European NGOs have already succeeded in implementing a ban by many local authorities on the importation of tropical timber. Arguing that virtually none of the timber is harvested sustainably, they have persuaded several hundred cities and towns to change their building codes and municipal purchasing policies to eliminate the use of tropical woods.

Perceptions by Greenpeace and others that Canadian forestry practices are similarly unsustainable could lead to similar campaigns. These sorts of actions are difficult to combat because they are "unofficial". As such, they cannot be the subject of hearings by GATT tribunals. Because they are emotional, they cannot easily be ended by resorting to facts and figures.

Canadian firms and regulators could well face a dual challenge in this area. On the one hand, the increased environmental awareness of consumers in some of our main export markets could lead to restrictions on Canadian exports. But Canadian consumers are also becoming increasingly concerned about issues of environmental health and will doubtless press all levels of government in this country to tighten our own standards. This in turn will affect the exports of other countries to Canada.

C Global Environmental Conventions

The Environment Scans prepared for CCME in 1991 and 1992 pointed out that we are entering an era when Canada's domestic environmental and economic policies will increasingly be determined by actions beyond our borders. Indeed, in the process leading to the United Nations Conference on Environment and Development, the negotiations on the conventions on climate change and biological diversity confirmed the trend toward dealing with global problems through international treaties. It also seems inevitable that

these conventions will have an influence on trade by affecting the consumption of various natural resources which are traded.

This is not a new phenomenon. CITES and the Montreal Protocol are the major international environmental agreements which pioneered the use of trade measures to deal with modern global environmental problems. CITES (1975) became the first example of a convention which sought to protect wildlife solely by regulating international trade in endangered species.[24] CITES contains appendices which list species in danger. These are updated every two years. If a species is listed in Appendix 1, all parties to the Convention are required to ban trade in those items. Items listed in Appendix 2 require a permit system for their entry into trade.

Perhaps the most notable recent example involves the banning of international trade in elephant ivory. Many credit the ban with the resurgence of the elephant population in a number of East African countries. Others take the view that the ivory ban is impairing the elephant management programs of some African countries.

The Montreal Protocol seeks to protect the ozone layer by taking measures to control equitably the total global emissions of substances that deplete it. It specifically controls the production and consumption levels of substances beyond certain limits. The Protocol also restricts trade with non-signatories to prevent the environmental benefits of mandated cutbacks in participating countries from being replaced by the production and consumption of non-participants. In principle, the role of the trade sanctions is to prevent non-member nations being free-riders on the efforts of the members to protect the global environment.

The acid test will come when the Framework Convention on Climate Change is strengthened to include targets for emissions of greenhouse gases and timetables for reaching those targets. Such a convention will eventually require some sort of enforcement mechanism, such as trade sanctions against non-members, and a redistributive component to enlist the support of the developing world. Such a convention will have profound implications for Canada since it is a heavy energy user and major energy producer.

D Environmental Measures and Internal Barriers to Trade and Investment

Although interprovincial barriers to trade and investment are widely discussed, there is relatively little independent analysis of the effects.[25] Indeed, the term interprovincial barriers is slightly misleading because some of the internal barriers are derived from federal or concurrent federal-provincial legislation, and not all of the barriers are imposed along provincial boundaries. Thus, the term internal barriers is more appropriate.

The term barriers to trade and investment is value-laden and covers a wide range of measures. Much of the existing analysis simply seeks to provide an inventory of different types of barriers. Some barriers are applied at provincial borders, such as restrictions on trade in agricultural commodities subject to supply management, such as dairy products and poultry, or British Columbia's restrictions on exports of logs. Other barriers operate within jurisdictions such as procurement preferences or restrictions, subsidies and restrictions on investment.

The term "barriers" is normally used for "discriminatory" restrictions to trade or investment. For example, the P.E.I. policy of requiring only refillable bottles does impede trade and may affect investment in bottling plants in the province, but it is not contrary to the GATT obligation to national treatment or nondiscrimination in the treatment of domestically produced and imported products.

In Canada there appear to be relatively few environmental policies or other measures affecting the environmental industries which can be regarded as overt discrimination. Preferential procurement practices have the effect of fragmenting the environmental industries which supply environmental control services and products and thus impair their competitiveness. There is no evidence that provinces impose environmental regulations that stipulate only provincial suppliers of environmental abatement services or products can be utilized. However, detailed environmental regulations that dictate the control process instead of setting ambient standards may have the effect of favouring particular suppliers.

Explicit financial subsidies for environmental purposes such as pollution control are not normally trade-distorting but they may influence investment decisions. However, there may be political pressures to weaken or defer enforcement of environmental regulations as well as providing various other types of subsidies for obsolescent industrial or resource processing facilities.

Differences in environmental regulations among Canadian jurisdictions can have significant effects on competitiveness, even if they are not explicitly discriminatory barriers. For example, if every province follows very different approaches to recycling or reuse regulations, the result could be chaos for the packaging and food processing industries. Similarly, divergent approaches to emission standards in the industrial and resource sectors will increase sharply the cost of regulatory compliance. Of course, pure harmonization in the form of uniform environmental regulations across all Canadian jurisdictions is difficult to achieve and is not necessarily desirable because of differences in absorptive capacity. However, convergence in regulatory approaches among Canadian jurisdictions will minimize the costs of achieving environmental objectives and enhance competitiveness.

3 ASSESSING THE IMPACT OF TRADE AGREEMENTS ON THE ENVIRONMENT

Much of the debate about trade policy and the environment has focused on the effects of international trade agreements in general, and the GATT in particular, on the various policies which countries might employ to protect the environment. This section reviews briefly some of the main provisions of the GATT, notes some issues with respect to the Canada-U.S. Free Trade Agreement and the NAFTA which was recently negotiated (which is still subject to ratification by the respective governments), and raises some issues about the relationship between these various agreements.

A The General Agreement on Tariffs and Trade (GATT)

The principal set of multilateral agreements governing international trade are the General Agreement on Tariffs and Trade (GATT) and related codes and subsidiary agreements. The GATT dispute settlement process has evolved significantly in recent years and recent

panel decisions about the application of the GATT provisions to international trade measures, which are claimed to be predicated on environmental objectives, have been controversial. The dispute settlement mechanism is the institutional provision in a trade agreement which provides the means by which differences of view between parties can be settled.[26]

Before considering these issues in detail, it is useful to review the relevant GATT rules pertaining to environmental measures. The key provisions in the GATT involve the concept of national treatment as applied to internal regulations of products, the provisions of GATT governing import and export quotas, the GATT provisions regarding technical requirements and standards, and the special exceptions in the GATT relating to protection of "human, animal or plant" health and the conservation of exhaustible resources.

The key provision in the GATT pertaining to internal regulation is the commitment under Article III to national treatment. The concept of national treatment is deceptively simple -- it means that imported products receive treatment that is no less favourable than that afforded domestic products.

The GATT rules pertaining to standards and technical requirements have evolved incrementally over decades. The main provision is the application of national treatment to product standards. The only other provision in the GATT (under the General Agreement itself), that applies to standards is Article X, where there is an observation that countries should publish and notify all regulations of commerce, including those related either to standards, to deceptive business practices or other related issues. Article X also states that countries "shall administer in a uniform, impartial and reasonable manner all its laws, regulations decisions and rulings." Moreover, it is suggested that this obligation extends to delegated authorities, including private non-governmental standards authorities. The GATT rules on standards were elaborated in the Agreement on Technical Barriers to Trade concluded in the Tokyo Round. Further refinement of these rules is proposed in the Uruguay Round.

Note that there are no obligations in the GATT to harmonize product standards. Countries are permitted to impose different or more stringent standards if they so choose. However, the national treatment obligation means that the standards must be applied in a non-discriminatory fashion to domestic and imported products.

Article XI of the GATT prohibits quantitative restrictions on imports or exports, but some specific exceptions are permitted. More important, and perhaps more interesting, are the provisions under Article XX of the GATT concerning the exceptions permitted under the GATT. These exceptions include the ones that provide for "the conservation of exhaustible resources" and those regulations "necessary to protect human, animal or plant life or health." Therefore, under this latter provision a wide variety of environmental, phytosanitary (health-related) and other issues are now considered to be an exception under the GATT rules of Article XX.

Interpretation of the exceptions under Article XX of the GATT is the key issue in the trade dispute between Mexico and the United States over the ban on the importation of tuna under the Marine Mammals Protection Act. As discussed previously, the issue arising in the tuna/dolphin case is whether an importing jurisdiction can impose an import ban because there is a perceived adverse environmental impact from the production process utilized in the exporting jurisdiction. It seems clear that Article XX of the GATT permits considerable latitude for import restrictions when there is a threat to "human,

animal or plant life or health" in the importing jurisdiction, but the exception does not appear to extend to extraterritorial policing of the environmental impact of production processes. The finding of the tuna panel on the "extrajurisdictional" application of Article XX has proven controversial, and the issue of the rules justifying the Article XX exceptions for measures which stated objectives are protection of the environment and conservation of exhaustible resources, is likely to remain controversial.

At present, Mexico and the United States are negotiating an out-of-court settlement to the tuna/dolphin case. However, regardless of whether the decision of the GATT panel on the tuna-dolphin case is adopted, the issue of applying import restrictions because of the environmental impact of the production process in the exporting jurisdiction is going to remain a contentious issue. U.S. Senator Baucus has made a proposal for an environmental code to deal with these issues and there are related proposals to amend antidumping and countervailing duty laws.[27]

It is ironic that the U.S. agencies which have argued for a broad interpretation of the GATT environmental exceptions in the tuna-dolphin case, are claiming that Ontario's recycling tax on beer cans is contrary to the GATT. The beer dispute involves other issues as well, but the Canadian position has been that the U.S. should get a GATT panel ruling on whether the recycling tax meets the test of being "arbitrary and unjustifiable discrimination" instead of retaliating unilaterally.

B The Canada-U.S. Free Trade Agreement and the NAFTA

Although there was some debate about the consequences for environmental policies under a Canada-U.S. Free Trade Agreement (FTA), these issues arose largely after the negotiations were completed. There are very limited provisions in the Canada-U.S. FTA pertaining to environmental issues because the GATT obligations are largely preserved with some notable modifications. For example, GATT Articles III, XI, and XX are incorporated in the Canada-U.S. FTA. The GATT provisions governing restrictions on the export of exhaustible resources are modified by a pro-rationing provision in the Canada-U.S. FTA. Also, as is common in free trade agreements, export taxes, as well as import duties, are to be eliminated.

Until recently, most of the trade restrictions countries have imposed on environmental grounds have involved phytosanitary standards. The objective established in the Canada-U.S. FTA was to achieve voluntary harmonization of standards in specific products such as veterinary medicines, but progress has been extremely limited.

More importantly, new types of issues have arisen because of trade restrictions imposed on environmental grounds. It is interesting to note that the first two cases under the Chapter 18 dispute settlement process of the Canada-U.S. FTA -- dealing with Canadian landing requirements for salmon and herring and U.S. size requirements for lobsters -- involved the interpretation of the exceptions in GATT Article XX. It is also noteworthy that the panel on U.S. size requirements for lobsters was handled slightly differently than the Mexican GATT complaint about U.S restrictions on tuna imports.[28]

The proposed North American Free Trade Agreement contains a number of environment-related provisions. The preamble makes an explicit reference to sustainable development. There are proposals to include environmental experts in panels and to make certain environmental evidence is presented to panels. Responding to concerns about

environmental issues, there is a proposed obligation that derogation of environmental standards should not be used as an investment inducement or to defer plant closure. This provision does not impose mandatory contractual obligations, since the only requirement is for intergovernmental consultation. However, this provision provides a vehicle for the proposed trilateral environment ministers council and the trilateral trade commission to address concerns about investment-inducement effects of relaxation of environmental measures and the effects on competitiveness of differences in environmental regulations. Since the NAFTA retains the FTA provision permitting the parties to pursue bilateral disputes either under the GATT or under the Agreement, there may be implications for GATT dispute settlement mechanisms, especially for cases involving environmental issues. The NAFTA gives precedence to international environmental agreements - CITES, Montreal Protocol and the Basel Convention - and some bilateral environmental agreements.

Opinions are divided over the extent to which the proposed text sufficiently addresses environmental and sustainable development issues.[29] Environmental organizations in both Canada and the United States are calling for a strengthening of the environmental provisions, and President Bill Clinton has suggested that a supplementary agreement on the environment is a precondition for his support for the proposed agreement.

Outside of the NAFTA, the U.S. Administration, Canadian and Mexican governments have launched a parallel effort to foster voluntary cooperation on environmental issues, including control of transboundary pollution and technical assistance to the Mexican environmental authority to strengthen its enforcement capabilities.[30] Apart from voluntary cooperation, there are administrative efforts to strengthen enforcement under the U.S. Foreign Corrupt Practices Act to investigate multinationals which may be attempting to bribe Mexican environmental regulators. To further enhance bilateral and trilateral cooperation, the environment ministers of Canada, Mexico and the United States agreed, in principle, to the creation of a North American Commission on Environmental Cooperation.[31]

1 *Indirect Effects and Harmonization Pressures*

Canada's free trade debate did raise the issue of pressures to harmonize environmental standards and regulations as a result of increased competitive pressures when trade barriers are reduced. This issue was raised primarily on the Canadian side, because Canada had higher trade barriers and the smaller economy. Canadian environmentalists were concerned that Canada's environmental regulations would be diluted to the U.S. standards, which were perceived to be lower than Canadian standards. Quite apart from the question of the magnitude of these economic harmonization pressures, there were questions of fact about Canadian perceptions: standards of environmental regulations in the two countries are broadly comparable, but where there are differences, Canadian environmental regulations have tended to lag behind those in the United States, except in the case of control of emission of acid rain precursors where Canada had moved well in advance of the U.S. Clean Air Act of 1990.

Environmental issues loomed large in the debate in the U.S. Congress about the extension of negotiating authority for the free trade negotiations with Mexico. A range of environmental concerns were raised including worries about health and phytosanitary standards such as pesticide residues on horticultural products from Mexico; bilateral transboundary pollution issues; the perceived impact on competitiveness of lower

Mexican environmental standards and less vigorous Mexican enforcement of those regulations; and broader issues of the environmental impact of trade liberalization and Mexican economic growth.[32]

However, the Canadian Environmental Review of the NAFTA[33] notes that "Mexico's environmental law, regulations and norms are similar in stringency to the laws and regulations of developed countries". Similarly, a preliminary report by the U.S. Environmental Protection Agency on Mexican environmental laws and standards concluded that Mexico's 1988 General Law of Ecological Balance and Environmental Protection (General Ecology Law), which is the current basis for Mexico's environmental protection program, embodies principles and approaches similar to those included in U.S. legislation.[34] However, there is continued concern in both Canada and the United States about Mexico's enforcement ability.

Efforts have since been expended by the Mexican government to counter criticisms about its weak compliance, monitoring and enforcement practices. Mexico's environmental agency, SEDUE, increased its budget eight-fold, has negotiated with the World Bank for a loan to enhance industrial inspections, and has effected both temporary closures and permanent shutdowns of industrial plants for environmental violations.[35] Nevertheless, since Mexico is at a stage of economic development quite different from the United States or Canada, and given the fact that Mexico operates under a different legal system and framework, the issues of harmonization have raised much more concern than in the case of the Canada-U.S. FTA.

Given existing information, however, there are two sharply contrasting views of these issues. One view is strongly pro-trade and argues that open trade promotes sustainable development. For example, an OECD study[36] argued that trade restrictions in the form of tariffs, voluntary restraint agreements and orderly marketing agreements, as well as preferential trade arrangements within regional groupings, can have a negative effect on the environment. Moreover, by protecting domestic industries, weaker environmental standards may be encouraged and production and trade flows diverted away from environmentally-sustainable patterns. Industries with the political clout to obtain trade protection and subsidies may also be able to obtain the weakening of environmental regulatory standards. Similarly, the OECD noted that trade-related investment measures may hinder the transfer of environmental technology. Finally, protection of intellectual property rights may encourage innovation and technology diffusion, including environmentally benign technologies which can enhance competitiveness.

Critics, however, argue that although more trade provides an impetus to economic growth and increases allocative efficiency, the push towards open trade has often been detrimental to environmental protection. Environmentalists are concerned about existing provisions of the GATT which, through its successive rounds of multilateral negotiations, seeks to reduce barriers to trade so that resources can be allocated efficiently on a world scale. By prohibiting the use of measures (tariff or non-tariff) which arbitrarily and unjustifiably discriminate between countries, it is argued by some environmental advocates that GATT, in effect, limits the ability of national governments to use policy instruments to affect domestic economic activity. Although GATT Article XX allows exceptions for the protection of human, plant and animal health and safety, these are considered by some critics as insufficient to protect the environment.

Critics also argue that to the extent that environmental protection is a policy in force, any move towards trade liberalization is expected to increase competitive pressures. It is

alleged that the differences between developed and developing countries in terms of environmental standards relating to both products and processes of production lead to differences in comparative costs. This gives undue advantage to developing country industries which may be discouraged from setting tough environmental standards or are subject to lower environmental standards. In turn, this adversely affects the competitive advantage of industries in developed countries. In response, developed countries may be induced to lower their standards to a lower and more common denominator to remain competitive.[37] Moreover, they may be induced to relocate their dirty industries to low-standard jurisdictions.

2 *Industry Relocation and Pollution Havens*

The pollution havens argument is often based upon a simplistic view of overall business strategy in a world of global competition. In his examination of this question, for example, Duerksen concluded in a 1983 study that elements other than cost of compliance influence a firm's decision to stay or relocate. Also under consideration are such factors as market access, availability of raw materials and substitutes, political stability, the availability of labor and supporting infrastructure, technical innovations and quality control. Indeed, a 1983 study concluded that, over time, nearly all industries adapt to environmental regulations in the longer run, particularly through technological innovation. In a joint study with Leonard and using U.S. trade and investment data, Duerksen concluded that the most pollution-intensive industries such as chemicals, paper, metals and petroleum refining favoured highly industrial and heavily regulated host countries. Also, U.S. foreign direct investments in pollution-intensive industries did not increase much over a period of time. Knodgen reached the same conclusions with respect to West German firms.[38]

Other studies arrived at similar conclusions. In a 1982 study, Ingo Walter examined foreign direct investments by firms from Western Europe, Japan and the United States between 1970 and 1978. He found no evidence that differing environmental costs were responsible for the existence of dirty industries around the world.[39]

Available studies have reached the common conclusion that on an economy-wide scale, there has not been much serious and significant relocation on environmental grounds. However, caveats have been expressed which are worth considering when further in-depth and empirical studies need to be conducted.[40] First, the conclusions reached by existing studies cannot be considered conclusive because of the time frame of the data used and the fact that circumstances have changed since the 1970s and 1980s. Second, anecdotal evidence, case studies and surveys of individual firms suggest that environmental regulations have played a role in relocation decisions. These referred to specific industries in the maquiladoras, mineral processing, toxic products and intermediate organic chemicals.[41] Third, even if industrial relocation has been limited so far, it could become more significant in the future as environmental regulations become more stringent.

Trade restrictions against developing country exports to improve environmental standards or to enforce higher environmental standards similar to those prevailing in the developed countries could be counterproductive. Environmental assimilation capacity not only differs across areas and across borders, but may also constitute an element of comparative advantage in trade. This capacity has been defined as the ability to absorb wastes and render them harmless.[42] This capacity is both physical and societal. Differences in the

physical capacity are derived from the type of climate which influences the impact of certain effluents on the production process, the level of rainfall which impacts on the air quality of certain types of emissions, the level and pattern of industrialization and the density of population in a given area.[43] As for the societal determinants of this capacity, several factors must be considered. Societies perceive and manage risks differently and prioritize environmental protection differently which reflects historical and cultural differences, and differences in level of income and economic development. Similarly, societies treat uncertainty and discount the future differently.[44]

These differences are considered by many Third World governments as factors governing the flow of trade or a basis of comparative advantage in the same way as differences in the endowment of other factors of production are considered. Attempts to interfere with the perceived comparative advantage of developing countries in this regard, either by enforcing uniformity of standards or by restrictions against exports of developing countries, could create serious tensions in the global trading system.

4 CASE STUDIES

A Climate Change and Energy

The energy industry is likely to be more severely affected by the environmental revolution than any other. New regulations for nitrogen oxides (NO_x) and volatile organic compounds (VOCs) will affect the formulation of gasolines. In extreme cases of air pollution, such as the Los Angeles Basin, automobiles will be forced to switch to new fuels altogether. The search for new sources of fossil fuels is becoming controversial -- the dispute in the United States over drilling in the Alaska National Wildlife Refuge is but one example. Acid rain is forcing many users of coal to install expensive new sulphur dioxide (SO_2) control mechanisms. Electric utilities are faced with public opposition to the siting of new power plants and transmission lines. Even hydropower, the relatively "clean" Canadian electricity source, has its environmental drawbacks. All of these will have consequences for the competitive position of Canadian industry, much of which was built upon access to cheap and abundant energy.

But all of these problems may fade into the background when the international community begins to take the threat of global warming seriously. The Changing Atmosphere Conference, held in Toronto in 1988, drew attention to the gravity of the problem. It was followed by a number of other consultations leading up to the Second World Climate Conference and the establishment of the Intergovernmental Panel on Climate Change. The IPCC scientific working group contained most of the world's prominent climatologists. Its report predicted a warming pattern over the next 50 or 60 years greater than that experienced over the past 10,000.

Governments reacted to this news by establishing a negotiating process for a global convention on climate change. In May, the INC (as the negotiating group was known) completed the Framework Convention, which was signed in Rio by more than 150 countries. Canada had pressed for targets and schedules during negotiations at meetings of the IPCC.[45] At the insistence of the U.S., however, the final text of the Convention did not contain legally-binding targets and schedules for reducing emissions of CO_2 reductions and other greenhouse gases. Fifty ratifications are needed for the agreement to come into force.[46]

While the Convention did not include binding commitments for the reduction of emissions, the EC re-affirmed its target to stabilize its emissions at 1990 levels by the year 2000. Meanwhile, the German Chancellor issued an invitation to the parties to the Convention to hold their first conference in Germany not later than one year after the Convention enters into force as agreed upon. This first meeting of the parties will have to deal with the issue of targets and timetables again within the context of commitments.

Even the present version of the Convention has some trade or competitiveness implications. The Convention calls upon the developed countries to reach stabilization of CO_2 emissions by the year 2000. The Convention also requires countries to report on their emissions of greenhouse gases and on any policies they have which will either reduce or increase those emissions. This could lead to serious public examination of national energy policies, including subsidies to fossil fuel projects. Both the Prime Minister and Minister of the Environment reaffirmed the Canadian commitment to stabilization by the year 2000 in Rio.

It is also likely that future amendments to the Convention will call for further concrete actions to deal with emissions. These amendments may follow the evolutionary pattern set by the Montreal protocol. As the science of ozone depletion has become more robust and sophisticated, the requirements for the elimination of chloroflourocarbons (CFCs) have become progressively more stringent. This has placed greater and greater pressure on the producing countries to accelerate their technological timetables. As the substantial investments in scientific research into climate change begin to bear fruit, the Framework Convention on Climate Change may have to develop further "teeth". When this happens, Canada will find more and more of its energy and environment policies determined in the international arena.

The ozone negotiations also revealed the necessity of obtaining Third World support for any agreement. This led to the development of the ozone protection trust fund to help developing countries through the transition away from CFCs. It is clear from the Rio experience that the developing countries have little intention of taking action to curb their own emissions of greenhouse gases until considerably more money is put on the table. Estimates of the sums involved vary, but are daunting even at the low end of the scale.

As the CCME Ministers have already discovered, even the relatively modest goal of stabilization is likely to engender controversy for Canada and its energy-intensive industries. According to many in the energy business, the costs are likely to be high, both in terms of reduced GNP and investments in new energy technologies. As pointed out in an earlier section, these costs are likely to fall hardest on many of Canada's traditional export industries. It is well known that most of the mineral processing sector and the forest products industry, for example, have relied on cheap energy.

Yet here again, the effects on Canadian competitiveness are not necessarily clear cut. Numerous studies have shown how the link between economic and energy growth has been broken. In fact, one controversial study performed by the DPA group for the Canadian Council of Ministers of Energy contended that Canada could reduce its CO_2 emissions and actually save money. Since the 1970s, Japan's GNP has grown by more than 80 per cent, yet its CO_2 emissions have hardly increased. Even the United States has seen its emissions of CO_2 drop since the oil shocks of the 1970s. The reasons for this are no mystery: while Canada reacted to the Arab price increases by trying to cushion its industry from the effects of high energy prices, other countries passed on the increases to their consumers. Japan and many European countries went one step further, augmenting

the world price increases with higher energy taxes and tougher energy efficiency standards. This led Japanese and European (especially German) industry to invent the energy efficient technology of the 1980s and 1990s.

There are indications that these countries intend to repeat their performance in the 1990s. Led by the German goal to reduce CO_2 emissions by 30 per cent by the year 2000, the European Community is pressing ahead with a stabilization plan for the whole community (which allows the poorer members to actually increase their emissions). Germany has a comprehensive plan to achieve its goal through such policies as energy taxes, tougher efficiency standards, and better public transport. Taking this one step further, the Japanese government and industry have formulated a 100 year plan to make Japanese industry more energy and raw material efficient. After a good deal of protest, Japanese industry has supported this plan because they feel that it will offer them a technological edge in the next century.

This has led some observers to conclude that Canadian industry must make major strides in energy efficiency to remain competitive. As Sonnen has illustrated, the timing of these investments is also critical: the longer Canadian industry waits to make the necessary investments in efficiency and renewables, the more likely that it will be forced to purchase the necessary technology from those countries which are now accelerating their own technological development.

Finally, the setting of international targets implies some sort of eventual enforcement mechanism, with trade sanctions likely forming some part of that mechanism. The 1989 Hague summit provided a foretaste of some of the remedies that may be proposed. At that summit, the governments of France, the Netherlands and Norway came forward with a proposal to create an international agency to regulate greenhouse gas emissions. Decisions of the authority would not need to be unanimous (i.e., no veto), and the authority would have the power to bring violators before the World Court, which in turn, would have the power to invoke trade sanctions. The proposal was watered down for the final communiqué and watered down even more when presented by French President François Mitterand at the G-7 summit later that year. But it does illustrate a tendency for recent international environmental agreements to be accompanied by effective trade measures.

No climate agreement will work without the co-operation of the Third World. If India and China were to proceed with their plans to greatly increase their production of electricity from coal-fired power plants, they alone would wipe out the savings from CO_2 reduction programs in Western Europe and North America. Moreover, the key to that North-South co-operation lies in the transfer of financial resources. The Toronto Conference proposed a global carbon tax, with at least some of its proceeds utilized to help developing countries to pursue more sustainable forms of energy development. Even the mention of such a tax in the North American context is bound to stir controversy. Recently, a certain amount of thought has also been given to the use of tradable emission permits for CO_2, similar to the system developed under the U.S. Clean Air Act for SO_2. Both of these will clearly impact on the Canadian energy industry.

Whatever mechanism is developed, however, the costs are likely to be substantial. Estimates of the amount required vary, but $30-50 billion per year were mentioned in the UNCED process.

B Forest Products

It is no secret that Canada's forest products industry faces serious competitive challenges. Plagued by overcapacity, high costs (in 1990, Canadian costs to produce a ton of newsprint were 20 per cent higher than similar costs in the United States) and under investment, the pulp and paper industry has seen its world market share drop substantially.[47]

Despite the cyclical nature of the business (almost everyone's pulp and paper companies are losing money), it is clear that Canada's comparative advantages in this industry are quickly eroding. New technologies have allowed greater use of short-fibre pulps, reducing Canada's advantage as a producer of long-fibre pulp and newsprint. Inadequate forest management in the past is leading to higher costs for wood in some segments of the Canadian industry, because of factors such as increased haul costs, the increased financial costs and environmental impacts of utilizing steep, rocky, and/or higher altitude timber sites, and uneven matching of the characteristics of resource availability to processing facilities. The industry feels that uncertainty over resource allocation and tenures has hindered effective planning in some cases. Yet now more low-cost developing country producers are coming on line. Their forest practices may not necessarily be sustainable, and may be less sustainable than Canadian practices in many instances, but they have large volumes of timber to tap and the new technologies permit the utilization of eucalyptus and hardwoods. Other factors include Canada's energy prices rising faster than those in other countries and the dramatic market changes taking place in the United States, Canada's largest newsprint market, not least of which are the drops in newspaper advertising and readership. Some of these factors are cyclical, and the problems of the pulp and paper and other forest products industries in Canada were exacerbated by the overvaluation of the Canadian dollar during the 1990-1991 recession. Yet the shrinkage of global market share for the Canadian pulp and paper industry will not be reversed and the longer term competitive challenges will not be removed by the decline in the Canadian dollar since late 1991 or cyclical recovery in global markets.

The fate of Canada's pulp and paper industry will also be at least partly determined by environmental regulations in Canada and other countries. The first of these pressures began to arise in the late 1980s when a number of American states and cities began to impose recycled content rules on their newspapers. In some cases, the recycled content requirement is at least 50 per cent. This will not only provide a strong incentive to build newsprint machines in the United States to be closer to supply. It will also increase costs for many Canadian producers, especially those distant both from urban markets and from cheap water borne transport for the importation of used paper. In the absence of any creative intervention by the U.S. federal government, there is no co-ordination among the states. According to Noranda Forests, the recycled paper requirement may eventually force Canada to import up to 4 million tons of used newspaper per annum. It will also doubtlessly force the closure of some of the more isolated Canadian mills, no matter what their costs of production of virgin pulp.

Although measures such as mandatory recycled content have major implications for the competitive position of the Canadian newsprint industry and have some discriminatory effects, they are not so overtly discriminatory as to be absolutely clear violations of international trade rules under the GATT or the FTA[48]. Recycled content requirements may be a less effective means of promoting recycling and reducing use of landfills compared to blue box collection systems and higher tipping fees for recyclable material. Some environmentalists are concerned that international trade rules will preclude the use

of certain types of environmental regulations and policies, but at the same time the trade rules do not presently provide clear criteria that would encourage the utilization of the most effective environmental regulations. This argues for greater integration of trade rules and international and domestic environmental considerations.[49]

The second pressure arises from the concerns of Canadians over the environmental effects of the pulp and paper industry. Canadian standards for effluent discharges from pulp and paper mills have traditionally been less strict than other producers in the developed world. For example, Sweden reduced its BOD from a national average of 108 kg/Air Dried Ton of Pulp in 1960 to 17 kg in 1989, and in 1990, Finland had reduced its average to 9 kg. In 1990, Canadian levels averaged 20 kg. Canadian environmental regimes emphasize obtaining compliance through industry-government monitoring and negotiation instead of litigious enforcement through the courts.[50] This type of approach could face challenges under supra-national regulatory regimes, such as the proposed North American Commission on the Environment (NACE) and could lead to conflict over proposed tough new standards for pulp and paper mills.

Under pressure from public opinion, both the federal and provincial governments have tightened the standards for pulp and paper mill effluent. Perhaps the most controversial of these steps was the recent proposal of the government of British Columbia to effectively ban the use of chlorine in the bleaching process by the end of the century.[51] Ontario is also considering new regulations.

The industry estimates that it will have to invest another $5 billion over the next few years to meet these standards (excluding the B.C. standard). The previously cited Sonnen Green Plan study estimates the additional costs to the pulp and paper industry at $260 million per year until the year 2000. This will dramatically reduce the amount of capital available for needed improvements in other areas of productivity. Since the industry under invested during the last boom cycle, new investment is desperately needed.

It is very difficult to judge in advance the effects of the proposed tougher environmental standards on the pulp and paper industry. Will the tougher standards stimulate new investment and technological innovation resulting in a more dynamic industry? Or will the industry spend hundreds of millions of dollars in scarce capital on achieving environmental objectives, shut down many existing facilities with adverse effects on employment in particular communities, and still face problems with green protectionism abroad?

Canadians are also concerned about the state of forest management in Canada. This concern is perhaps felt most acutely in British Columbia where the government is under pressure from citizens' groups to protect more of the province's old growth forests. It also manifests itself in other parts of the country in demands for new parks and protected areas and for an increased native voice in the management of resources. Combined with the poor forest management practices of the past, which have resulted in a looming shortage of wood already, these pressures are sure to drive up the costs of wood.

The third of these pressures results from the enormous explosion of awareness of environmental values by Europeans. This has led to calls by some NGOs for action by European consumers and governments. One aspect of this is the increasing demand for paper products from mills which meet strict environmental standards. The Chief Executive Officer of one of Canada's most competitive paper companies remarked

recently that the pressure from his European customers has become so severe that he is now running his mills to German, rather than Canadian, standards.

So far, most of these requirements have come from the marketplace, but they are certain to be followed by regulation. One of the likely areas for this sort of regulation is a requirement for the use of absolutely chlorine-free pulp, at least in certain products. Such process standards are controversial under the GATT, but there are strong pressures to enact such regulations.

As mentioned earlier, one of the aspects of European green consumerism most disturbing to the Canadian industry is the potential for a boycott of Canadian forest products. Recently, Canadian forest practices have been unfavourably viewed by a number of European television documentaries and newspaper articles. Perhaps the best known of the latter is a supplement published in the London Observer documenting the forest situation on Vancouver Island. Given the success of previous boycotts of Canadian sealing products and furs from animals caught in leg held traps, there may well be reason for concern.

These concerns were part of the reason for Canadian support of an international convention on forests. Such a convention, it is thought, could well contain provisions which would allow countries to indicate that their forest products were produced sustainably and would help to relieve consumer pressure. The convention proved unacceptable to a number of developing countries and was replaced in Rio by a weak set of non-binding forest principles. The document is called "Non-legally Binding Authoritative Statement of Principles for a Global Consensus on the Management, Conservation and Sustainable Development of all Types of Forests". Canada and other countries did, however, preserve the option for a future forest convention and informal discussions are now proceeding on how it could be revived. Although not binding, this Statement of Principles will also influence Canada's ability to formulate domestic policy as is the case with the Framework Convention on Climate Change and the Convention on Biological Diversity.

What is critical to understanding the current state of the Canadian forest products industry is that the chain of events that led to the present situation was not predetermined by Canadian factor endowments. Rather, the outcome could have been different if government policy had consistently been a catalyst for technological innovation and if Canadian firms had not been as focused on short-term business strategies. The various tenure arrangements of some of the provinces and some of the regulatory practices may have reinforced this emphasis of the Canadian forest industry upon the shorter term. The Canadian forest products sector has historically been more concerned about the commodity side of their operations, which was the easiest advantage to exploit given Canada's abundant forests, access to relatively cheap power, and good transportation infrastructure. This tendency was reinforced by foreign trade barriers on the more processed wood and paper products. Whatever the reason, the Canadian forest industry seems to have missed an opportunity to become technological leaders when other countries were just beginning to exploit their advantages in forest products or developing new technologies. Moreover, Michael Porter found in his analysis of the Canadian forest products sector that government policy has never actively encouraged or forced innovation and upgrading within the industry, and Canadian environmental legislation has historically failed to match the leading-edge standards adopted by a number of other advanced countries.

In summary, then, the Canadian industry is in a poor state, both economically and environmentally. But cries from the industry to either loosen existing regulations or delay the introduction of new rules could well prove to be counterproductive. Public opinion in Canada is unlikely to allow governments much latitude. But perhaps more important, Canada's domestic performance is likely to be increasingly scrutinized by an environmentally sophisticated market in Europe and the United States. In at least some instances these pressures in Europe and the United States are likely to be translated into regulations or sanctions which could impose significant burden on the Canadian industry or create obstacles to Canadian exports. In a real way, therefore, competitiveness in this industry may be determined by environmental standards. The strategic decisions about environmental policies within Canada, and the outcome of efforts to develop international arrangements for forest management and industrial processes and efforts to integrate environmental considerations into trade rules, will have significant implications for the competitive position of one of the largest Canadian industries. It is difficult to predict the outcome, but it is clear the stakes are high.

C **Packaging**

The amount of waste it generates is a very visible indicator of the extent to which a society impacts its environment. As the largest generators of waste on a per capita basis after the U.S., Canadians have become particularly concerned about their waste disposal practices. Recycling programs and the National Packaging Protocol are two of the most visible examples of how different levels of government are responding to this public concern. Both of these policies are having a significant effect on the way in which firms package and, in many instances, manufacture their products.

Recycling programs such as Ontario's "Blue Box Program" have become very popular with Canadians. In a May 1991 study of 43,000 Canadian households, Statistics Canada found that while only about half of Canada's households have recycling services for paper, metal cans and glass containers available to them, nearly seven out of eight of those households use the services. The previously-cited study on differences in consumer behavior mentions Ontario's Blue Box Program as one of the main reasons to help explain why Canadians are so much more likely to recycle than Americans and Mexicans.

The tri-country survey also revealed other interesting aspects of consumer behavior, which are having a dramatic effect on purchase decisions by Canadians, particularly with respect to packaging. Concerning "environmental lifestyles," the survey found that eight out of ten Canadians recycle cans or bottles on a regular basis; and nearly six in ten regularly recycle newspapers. Moreover, approximately 30 per cent of Canadians regularly buy products made from or packaged in recycled materials. The survey concluded that Canada holds the North American "record" for the highest level of personal involvement in these areas and others.

At the national level, the focus on the 3 Rs -- reduce, reuse and recycle -- [52] is being encouraged by Canada's National Packaging Protocol (NAPP), which includes specific targets to reach a 50 per cent reduction in packaging by the year 2000. Canadian firms are developing new products and new production processes to achieve these targets.

1 *The German Packaging Legislation*

While Canada may be at the forefront of waste disposal practices in North America, the international standard is increasingly being set in Germany. On April 19, 1991, the German Bundestag gave its consent to the Ordinance on the Avoidance of Packaging Waste, the first step in a series of government measures to put the ultimate responsibility on producers for retrieval, recycling, re-use and disposal of their products. By government decree, everything from newspapers to cars will eventually be recycled. This legislation is causing a fundamental restructuring of the German packaging and waste management industry, and is likely to become the standard upon which waste management programs around the world will be judged.

The legislation has three main objectives. First, it is intended to take the responsibility for used packaging away from municipalities and to put it into the hands of industry. Second, it is structured to ensure that the focus is on recycling and re-using instead of any other form of waste management. Finally, the law is intended to reduce substantially the amount of waste put in increasingly scarce landfills.

These objectives are to be achieved in a series of stages. As of December 1991, the ordinance required manufacturers and distributors to collect transport packaging and to ensure that it is recycled as a valuable material. Since April 1, 1992, distributors have been required to either re-use or recycle for re-use all secondary packaging.

Since January 1, 1993, manufacturers and distributors have been responsible for ensuring that all sales packaging is either re-used or recycled for re-use. This was also the deadline for bringing the end user into the product life cycle chain with the introduction of a mandatory common fund to which the manufacturers of throw-away packaging, packaging of washing and cleansing agents and emulsion paints must contribute. To give some flexibility, manufacturers, if stringent prerequisites are followed, can replace this common fund system with comprehensive consumer-friendly systems of return (so-called dual systems).

There are four basic timetables and waste reduction targets included in the legislation. First, by July 1, 1995, at least 80 per cent of all types of packaging, including glass, paper, metals, plastics, and outer packaging must be covered. Second, by the same deadline, certain sorting rates must be reached: 90 per cent for glass, tinplate and aluminum; and 80 per cent for each of the other forms of packaging. Third, all sorted valuable materials must be recycled and re-used as such; incineration is not an option. Fourth, there are timetables and targets for guaranteeing existing return quotas (72 per cent) for beverage packaging and increasing this return quota in particular areas. Lastly, there are requirements with respect to the integration of existing municipal collection systems for valuable materials. Fines for not observing the law can reach DM100,000 (CDN$74,500).

Although the first stage -- transport packaging -- has now been in place for six months, manufacturers and merchandisers are still trying to sort out who will bear the annual cost (approximately $750 million) of collecting and transporting 2.3 million tons of packaging material. The real test, however, comes next January, when firms are required to ensure that all packaging used by Germany's 80 million consumers is either taken back at stores or collected by a system that is independent of the municipal trash collection service. The greatest challenge is to create what is, in effect, a national redistribution system for packaging, and connecting this system back into the production process.

European companies based outside of Germany have complained that the system violates free trade principles by discriminating against foreign companies. Sixty major European and international companies have also banded together to lodge a formal complaint with the European Commission, charging that the new German law not only restricts free movement of goods into Germany, but that it is also ecologically unsound; the legislation, for example, does not take into consideration the amount of energy expended in the collection and recycling of materials.

Environmentalists have also questioned the effect of the legislation, arguing that, for example, by not differentiating between less and more harmful packaging materials, it does little to actually reduce waste. They also argue that current technology is not capable of effectively recycling many artificial materials.

Nevertheless, there are indications that the regulations are having a significant effect on how firms package their products and how they monitor the lifecycles of their products. Secondary sales packaging is already disappearing from German store shelves, as is plastic transparent packaging. Hewlett-Packard, for example, no longer packages its machines in styrofoam, which is difficult to recycle, but instead fills boxes with used paper. One company found it could replace plastic packaging with one small paper band by folding their trash and freezer bags in a different way; the new folding method has since reduced packaging waste from 500,000 units from 7,000 to 800 kilograms.

The collection of secondary packaging has flooded an already oversupplied recycled paper market, forcing German companies to look at ways to either upgrade their recycled paper and find new uses for it, or look to export markets. There is concern in Europe that German firms will flood the European market with these secondary raw materials.

The irony is that as firms outside of Germany lobby against the regulations, their own governments are following the German lead. France, for example, is working to develop its own redistribution system; in England, they are exploring ways to collect packaging through the existing municipal waste management system; and Denmark and the Netherlands are also working on packaging laws. At the same time, the German environment ministry is one step ahead of the game, already developing a law to require the recycling of used automobiles.

2 *Trade and Competitive Aspects of the Canadian Packaging Industry*

In Canada, the existing and proposed packaging regulations, reinforced by the strong public support for waste disposal programs that encourage the 3Rs, are having a profound effect on the way domestic firms are doing business. The structure of the emerging "green" industries and what the industry requires to remain competitive will most likely also have significant trade effects, particularly with Canada's largest trading partner - the United States.

Representatives of the packaging industry all agreed that the main competitive concern the industry faces at the present time is a lack of a level playing field, both interprovincially and internationally. In the absence of the harmonization of standards and regulations, there are three main reasons why Canadian firms currently find it difficult to compete and expand their operations.

First, there is the question of market access. In the absence of harmonization, firms are finding it very difficult to produce goods that can meet the varying standards and regulations in the markets in which they want to compete. It is also difficult to predict where government policy may go, thus complicating further the task of developing products to suit market needs. Under such uncertainties, it is difficult to make investment decisions, and it is particularly difficult to envisage ways to expand business, both nationally and internationally.

Production in the local market is a possible solution to the problem, but frequently not the most efficient and certainly one that could erode the competitive advantage some Canadian firms enjoy presently over their U.S. counterparts.

A good example that illustrates well the potential problems of market access for Canadian firms is the export of bottled beer to the United States, and specifically the impact of Canada's focus on the 3Rs versus the California emphasis primarily on recycling. In Canada, the legislation has forced the Canadian beer companies to produce beer bottles that are reusable; in California, 1990 amendments to the Public Resources Code require bottlers to make products that have a 65 per cent recycled content by the year 2005. While the legislation targets glass manufacturers based in California, some argue that it can be applied to imported glass bottlers such as Moosehead products from Nova Scotia and Molson products from British Columbia. The relevant authorities have not yet decided on this aspect of the legislation but if it is interpreted to include imported glass, it will affect Canadian beer exports to California. Currently, both Moosehead beer from Nova Scotia and Molson products from British Columbia are available in the California market. But since the Canadian regulations focus on reusing products, the Canadian beer bottles do not contain high levels of recycled content because the bottles are supposed to be reused and not recycled. Faced with this situation, the Canadian bottlers will have to either develop new products for export or set up a plant in California. If the latter strategy were chosen, that would have a profound effect on the Canadian beer industry. In the case of The Molson Companies in particular, it would have a significant effect on their current business strategy to rationalize domestic production facilities and build super-facilities to compete directly with American beer companies in both the Canadian and U.S. markets.

A second element of the interrelationships between trade, competitiveness and the environment, and related to the first issue, is that of sufficient demand. Moreover, as economics frequently dictates, the demand conditions can have a major impact on the kinds of production runs and the levels of investment, more generally, firms can make.

Resource Plastics of Canada is a good example of how demand conditions can be critical to a firm's overall business strategy. Based in Burlington, Ontario, Resource Plastics began operation six years ago and has become one of the largest post-consumer plastic recycling companies in the world. The company has thrived on the demand for recycled plastic that has grown out of increased consumer demand in Canada for such products and the growing supply of material from recycling programs.

Increasingly, however, economies of scale are becoming a critical factor for Resource Plastics. For example, if it were to become law, some of the proposed legislation in the northeastern United States would create a demand for recycled post-consumer plastics. This could lead to more firms entering the recycled plastic industry. If these companies proved successful, they could then become competitive threats to Resource Plastics: with lower cost structures due to economies of scale, they could out compete the Canadian

company on cost in both its domestic market and in the United States. This would be especially the case if, due to trade difficulties, Resource Plastics could not get access to plastic and to customers at the same level as U.S. companies. Indeed, faced with this possibility, there is speculation that Resource Plastics is presently considering options to build a plant in northeastern United States.

One way for Canadian governments to help develop larger demand conditions in the domestic market would be to require certain environmental standards on purchases by all government department and agencies.

Thirdly, the packaging industry in Canada is particularly concerned that they have agreed to voluntarily subsidize the Blue Box Program but that the companies whose imported products also end up in the blue boxes do not contribute to the program. As a result, imported goods enjoy a cost advantage over domestically-produced goods because the companies that produce these goods do not pay into the Blue Box Program. In the absence of a change in policy, it may make economic sense for some packaged goods manufacturers to relocate in the United States and supply Canada from there.

Lastly, there is the question of the health of the Canadian recycling industry and the development of Porter's "strategic clusters." In the last six years, approximately 70 new Canadian companies have sprung up to meet the changing demand conditions with respect to environment-friendly products. That is a very large number, and it is inevitable that some rationalization in the industry will take place, particularly if there is increased competition from the United States. There may therefore be a role for government in the promotion of this strategic cluster at this time.

D Environmental Business Opportunities

Changing consumer tastes for environmentally-friendly products, coupled with government regulations that attempt to encourage firms to act in certain environmentally-responsible ways have opened the door for the growth in the market for environmental goods and services and the emergence of a variety of new business opportunities. What is particularly significant about these developments is that many of these market segments are growing at rates that are much higher than annual GDP rates in Canada, and in some market segments as high as 21 per cent.

Determining the size of the market, however, critically depends on how it is defined (i.e., the range of activities included).

With respect to the Canadian environmental market, Industry, Science and Technology Canada includes the following categories in its definition:[53] dedicated environmental technology, products and services used by industry, multi-purpose technology, products and services with a range of applications (one of which environmental protection), clean industrial processes (use of which benefits the environment) and environmentally-friendly consumer products and services.[54]

For purposes of this discussion, however, the market for environmental goods and services will be defined according to four major segments. The first is the environmental protection industry, which is generally described as specialized products and services that are used to either avoid or clean-up damage to land, air and water.[55] This industry has

existed for some time now, but has recently gained in importance with the emergence of curbside recycling programs and other initiatives that deal with waste disposal issues.

A second category is that of new and/or improved environmentally-friendly product lines and services. These business opportunities have arisen mainly from the "greening" of consumer and manufacturer tastes and preferences. These preferences have been influenced by developments and trends in other "greener" countries, and are particularly noticeable in the new lines of products and processes available to both manufacturers and consumers.

The third category, which is only beginning to emerge as a significant market segment, is industrial ecology goods and services. Typically, this segment involves processes where the waste of one company becomes the material or energy of another, thereby reducing the effective amount of waste or emission in the environment.[56]

Lastly, there is the development of products where environmental standards have been integrated into the production process and into the product's overall design. The introduction by Electrolux of a super energy efficient refrigerator that uses significantly less CFCs than conventional fridges, as discussed subsequently, is an excellent example of this.

1 *Environmental Protection Industry*

Market segments within this industry include: suppliers of equipment, instruments, and supplies for pollution abatement, clean-up and resource preservation; construction and assembly of environmental systems on site; suppliers of environmental engineering and consulting services; suppliers of laboratory services; and suppliers of solid and hazardous waste management services including recycling, and suppliers of sampling and monitoring equipment and instrumentation.[57]

The OECD estimates the market at US $200 billion in 1990 and US $300 billion by year 2000 assuming an annual growth rate of 5.5%. It defines the industry to include end-of-pipe pollution abatement equipment (water and wastewater treatment, stack gas scrubbers, solid waste handling), engineering, management and consulting environmental services. It excludes technologies incorporated into processes for pollution prevention and "green" consumer products (i.e., energy efficient, with less toxic components and containing recycled materials).[58] For Canada, the market is valued at $5-7 billion annually with a yearly growth rate between five and seven per cent.[59] These figures pertain only to tradable dedicated environmental products, services and technology used by industry and with a specific environmental end use.[60]

There are no statistics on the specific rates of growth for the different components of the sub-industry. However, a picture may be derived from the annual spending estimates of the different industry sectors utilizing these goods and services. Municipalities spend from $2.1 billion to $2.5 billion for water treatment and solid waste management. This sector is expected to post a moderate growth of between 5% and 10% annually. The pulp and paper industry spends from between $700 million to $900 million for air emissions controls and water treatment, projecting to grow by more than 10% annually.[61]

Trends in the province of Ontario also give an indication of the national potential of this industry. From a survey undertaken by Ernst and Young, air pollution control firms

expect annual growth of 9-13 per cent in the next five years, and annual growth is expected to be as high as 15 per cent for water pollution control firms. Solid and hazardous waste firms foresee the most rapid growth at 15-21 per cent annually.[62]

Growth in the environmental protection industry is due to several factors. The trend towards tighter environmental standards has been identified as one determinant, and particularly a concern about controlling the level and rate of water and air pollution, reducing solid wastes and hazardous waste clean-up. Though much of the Canadian industry tends to be geared towards end-of-pipe solutions to environmental problems, increasingly the emphasis is on pollution prevention through process change. The other factor is increased demand for environmental technology development, due to the introduction of cleaner processes for production, pollution control, waste treatment and resource conservation.

Export markets are potentially very large. Based on other reports[63], the size of the U.S. environmental protection industry in 1990 was US $132 billion. The leading sales of both public and private companies were in solid waste management, resource recovery, water infrastructure, hazardous waste management, environmental consulting and engineering, water utilities and waste management equipment. On the other hand, the European Community market was estimated at close to US $100 billion in 1989. In 1991 the EPA estimated environmental protection expenditures in the U.S. at US $115 billion.[64] This is reflective of existing regulatory policies that have been instituted to address several environmental problems, which have since been exacerbated by population density. Spending in the U.S. for solid waste management is about $7 billion annually, while demand for incinerators in Europe is reportedly still high in spite of advances in recycling. The required installation of air pollution control devices also presents an opportunity for manufacturers of equipment which reduces emission of nitrogen oxide and sulphur oxide gases. For example, Ontario Hydro has reportedly succeeded in introducing its flue gas desulphurization technology in the United States. Turbotak which produces wet scrubbers, has tapped a market created by acid rain legislation. INCO has marketed its flash furnace technology which smelts copper sulphide concentrates.[65]

Potentially, Mexico represents vast export opportunities. Indeed, it is difficult to provide an exhaustive list of opportunities in Mexico, given the severity of some of Mexico's environmental problems. Mexico has reportedly a three year program beginning 1992 to spend US $500 million to improve the environment along the border, plus US $223 million for sewage plants, US $26 million for solid waste disposal and US $44 million for border area nature conservation.[66]

With respect to Western Europe, the potable and wastewater treatment market segments account for one-third to one-half of the total market environmental protection market, and solid waste and air quality concerns make up the remaining market segments. The market for integrated clean technologies is largest in Germany and the Netherlands, with recycling and composting of waste significant in West Germany, Belgium and France. Other countries are considered very far behind in their technologies. This could prove fortuitous for Canada, be it through direct exports or through joint ventures.[67]

Opportunities in Eastern Europe are also very substantial considering the region's environmental record and the extent of structural adjustments needed to bring the area up to western European standards. Westinghouse is already in Bulgaria, providing assistance in radioactive waste handling, low waste compactors and storage.[68] Opportunities in

Asia include Taiwan's $35 billion clean up program and Hong Kong's $3 billion clean up plan.[69] There are also projections that Taiwan will be spending US $105 billion over the next 10 years for environmental protection, with importations of pollution control equipment increasing by 20% annually.[70]

The market for these environmental protection goods and services continues to be supported by a number of international fairs such as the International Trade Fair for Waste Disposal (IFAT) held in Munich, Germany every three years; the International Trade Fair and Congress for Engineering in Environmental Protection (ENVITEC) in Dusseldorf, Germany; and the Environmental Tech Expo (ETE) in Chicago, which exhibits a whole range of environmental technologies.[71] For examples and opportunities in the environmental protection industry, please refer to Table 1.

2 *New and Improved Products and Services*

It is difficult to quantify at this time the size and growth of the current market for new or improved products and services. New business opportunities show up in a variety of different areas, products and services. For example, many production processes involve intensive utilization of raw materials and intermediate products (e.g., in packaging) which result in emissions and effluents that are highly damaging to the environment. Many products also become environmentally-damaging waste material at the end of their useful life unless properly disposed or recycled. As a result, changes in existing product and service lines, as well as processes, or the introduction of new lines can create if not expand business opportunities.[72]

Two strategies have been identified for converting a responsibility (both to the consumer and to the environment) into an opportunity.[73] The first is more a question of marketing strategy and the repositioning of an existing product or service line to make it environmentally-friendly or at least benign. This strategy frequently involves reducing the amount of raw materials for packaging or the final product, recycling and reusing products and packaging, eliminating or reducing the use of toxic substances, and adopting new technologies that use less energy or generate less waste or emissions. See Table 2 for examples.

The second kind of business strategy is to develop, license, purchase the distribution rights, or import a new product or service. In the area of chloroflourocarbons, for example, the Canadian government's commitment to end production and importation of halon by December 1994 and the phaseout of all CFCs by 1995 is a clear signal that new products are needed.[74] The market for CFC substitutes is substantial since the compound has largely been used in the production of refrigerants and coolers for refrigerators and air-conditioners, aerosol sprays, propellants and solvents. Japan and the United States are producing automobile air conditioners that run on HFC-134a, which is a non-ozone depleting greenhouse gas compound. See Table 1 for other examples.

3 *Industrial Ecology*

One of the more interesting emerging markets is that for waste products as shown in Table 3. In addition to creating new business opportunities, eliminating waste altogether can decrease costs. One growing cost is that of waste disposal. According to Independent Disposal Group Inc. (Mississauga) and Royaledge Industries, Inc. (Calgary), the cost of

dumping a ton of waste in Toronto municipal sites has jumped from $18.50 five years ago to $150. In Kingston, the cost increased from $20 a ton to $120 at present.[75]

On the waste elimination side, 3M's famous "Pollution Prevention Pays" program has saved the company about Cdn $580 million worldwide in the last 15 years. It has since encouraged other companies to adopt similar programs like Chevron's SMART (Save Money and Reduce Toxics) and Dow Chemical's WRAP (Waste Reduction Always Pays).[76] By eliminating the use of CFC-based solvents in its operations, Northern Telecom has saved not only the cost of the solvents but also the cost of paying CFC taxes in the U.S. and waste disposal.[77] Savings can also be realized from not paying emission charges and taxes.

Table 1
Environmental Protection Industry

Company	Product	Features
Solarchem Environmental Systems, Inc. (Richmond Hill, Ontario)	water treatment	destroys toxic chemicals in water with light rays and ozone
Trojan Technologies (London, Ontario)	wastewater treatment	disinfection of municipal waste water with ultraviolet light
Zenon Environmental Inc. (Burlington, Ontario)	water treatment product	
Knowaste Technologies (Mississauga, Ontario)	recycling	washing, sanitization and shredding of disposable diapers, napkins and incontinence pads
CVL Products Ltd. (Thorold)	blue boxes and backyard composters	utilizes ground-up rubber with recycled plastic
PCL and Eastern Packaging Ltd. (Saint John)	recycling of plastic products	
Fripp Fibre Forms Inc. (Winnipeg, Manitoba)	recyling of polystyrene egg cartons	
Agra Industries Ltd. (Saskatoon)	beverage container processor	sorts, crushes and bales glass and plastic containers
Lincoln Waste Mgt. Inc. (Toronto)	waste-water recycling facility	separates water and oil from oil and solvent-based liquid waste

Note: Sources derived from "Green products bringing in the green" Globe and Mail, May 11, 1992 and "Report on the Environment" Globe and Mail, June 4, 1991.

Table 2
Environmental Products/Services

Product Repositioning	Product	Features
Proctor/Gamble	phosphate-free detergents and enviro-packages for powder and liquid detergents	limits presence of toxic inputs and saves on packaging material
Northern Telecom	solvent-free operations	no longer uses CFC-113 since December 1991
National Sea Products Ltd (Halifax, Nova Scotia)	retooled freezing facilities	eliminates CFC emissions
Winnipeg Photo Ltd.	installation of two colour developer recovery machines	allows 85% recycling of chemicals
New Product Lines	**Product**	**Features**
Du Pont Canada Inc. (Maitland, Ontario plant)	CFC substitutes	considered 98% safer than CFC
W.C. Wood Company (Guelph, Ontario)	improved compressor system utilizing HFC-152a	
York Energy Conservation (Richmond Hill, Ontario)	ion stick	teflon-covered metal bar which, when attached to electricity source, clears water pipes of scale and bacteria
Pur et Simple (Quebec)	non-toxic paints and beeswax crayons	
Body Shop	biodegradable skin and hair care products	not tested on animals
Mobil Corporation	Mobil Arctic	synthetic lubricant for compressor using refrigerants

Note: Examples were derived from selected company annual reports; case studies in Canadian Chamber of Commerce "Focus 2000-Achieving Environmental Excellence: A Handbook for Canadian Business", September 1990; "Report on the Environment" Globe and Mail, June 4, 1991; and "Green products bringing in the green" Globe and Mail, May 11, 1992.

Table 3
Industrial Ecology

Company	Waste	Application
Du Pont	36,000 tons a year nylon waste product acid iron salts	pharmaceutical and coatings water-treatment
US textiles fibre factory	35,000 tons of fly ash	lightweight cement blocks
prune manufacturer	waste glucose	bottled juice
Molson	by-products from beer production	animal feed/fertilizers
Alberta Newsprint Co.	sludge	soil conditioner
National Sea Products	fish waste/leftover fluids	fishmeal

Note: Derived from *Fortune*, February 12, 1990; K. Chilton and M. Warren, eds. *Environmental Protection - Regulating for Results* (Boulder, San Francisco and Oxford: Westview Press, 1991); "A Survey of Industry and the Environment" *Economist*, September 8, 1990; Globe and Mail, May 4 and May 11, 1992; and case studies in the Canadian Chamber of Commerce "Focus 2000 - Achieving Environmental Excellence: A Handbook of Canadian Business" September 1990.

4 *Integrating Environment Standards into the Production Process and Overall Product Design*

Companies and governments are still beginning to realize the advantages of more integrated approaches to dealing with environmental standards in their business strategies. The process by which the Swedish-based Electrolux company developed a more efficient refrigerator is an excellent example of how environmental standards government and industry can work together to produce internationally competitive products.

In 1989, the Swedish National Board for Industrial and Technical Development (NUTEK) sponsored a competition to promote the introduction of more efficient refrigerator. Despite an average reduction in electricity consumption by refrigerators of 95 per cent over the last 30 years, these appliances still account for 30 per cent of household electricity consumption in Sweden. To speed up the product development process, Nutek decided to organize a competition open to all foreign and domestic manufacturers to design a super-efficient fridge-freezer. Nutek was also concerned about ensuring that the winning model met consumer requirements and would have a ready market. As a result, representatives of major refrigerator purchasers were invited to help draw up the terms of the competition.

A total of five companies entered the competition, two of which were Swedish. In December 1990, Electrolux, one of the world's leading manufacturers of refrigerators and

other household appliances, was announced as the winner. About 85 per cent of Electrolux's sales are in foreign markets.

The winning model consumes only 0.79kwh/l a year; the company also entered a super-efficient model that uses only 0.53 kwh.[78] In addition, Electrolux reduced the amount of CFCs used in both models, thereby cutting their contribution to global warming and ozone depletion to one-tenth. Electrolux also agreed to gradually introduce a label with product information on refrigerators and freezers produced in Sweden. Although the winning unit costs about 10-20 per cent more than a standards Electrolux unit, it is estimated that the added cost will be paid back in about four years due to the lower energy consumption. The payback period could be even shorter if, as expected, Sweden's low electricity prices rise a European average. If all manufacturers were to reduce their power consumption to that of the winning product, at least 2 terawatt-hours per year would be saved in Sweden 10-15 years from now -- an amount corresponding to almost half the yearly production of an average nuclear power plant.

On October 9, 1991, the first 80 new fridge-freezers were installed in the city of Gavle. While the winner originally was guaranteed the sale of 500 units -- mostly to new public housing units -- the publicity that the competition received translated into orders of more than 10,000 units by November 1991.

Although Electrolux admits that it was technically possible to have designed the winning model without government intervention, Bo Kylin, marketing manager of major appliances at Electrolux AB, argued that "before the competition the market just wasn't there!" More importantly, according to Tord Kyhlstedt, marketing director, the most important stimulus for going from prototype to product was the prospect of large orders, allowing the company to spread its development costs and thus reduce the sales price. Electrolux expects that the use of the products in new housing units will spill over to the still larger replacement market, where purchases are mainly made by individuals and families.

5 INTEGRATING ENVIRONMENTAL AND TRADE POLICIES

A Building a Vision of Sustainable Development

In the current recessionary climate, most governments in Canada are spending most of their time developing strategies for economic renewal. Because of the traditional view of competitiveness and concern for the environment as being enemies, environmental considerations are often absent from these strategies. And yet, the development of a strategy for restructuring on economic grounds provides an ideal opportunity to restructure an economy so that it is environmentally sustainable as well.

The Brundtland Commission and the Rio Conference have demonstrated once again that the earth's ecology and its economy are so closely interlinked that policies which ignore this reality are doomed to long term failure. A Sustainable Development strategy which integrates both economics and the environment at an early stage of the decision-making process is therefore vital to a country's success. It is also vital to its competitive position.

There are a number of elements of a sustainable development strategy which are central to the ability of a country to compete:

- **Anticipation and prevention**. As the Porter and the McKinsey studies point out, the most competitive firms are those which have a deliberate strategy to prevent pollution from happening in the first place. As the Sonnen studies illustrate, the old policy of cleaning up the mess after it happens is simply becoming too expensive. Both firms and governments must shift away from react and cure. In a May 1992 statement, the members of the Business Council on National Issues (BCNI) stated:

> "Sustainable Development on the other hand, embraces the entire development cycle. It is concerned with the form of development itself, with product design, production processes and marketing strategies. Its measures are efficiency, competitiveness, and macroeconomic and macroenvironmental performance. Sustainable development seeks to ensure that environment and development are mutually supportive at the front-end of the cycle when societal goals and policies are being set, not at the tail-end after society and the economy has already incurred the damage costs of unsustainable development."[79]

- **Ensuring economic incentives support sustainable development**. Unless they explicitly incorporate sustainable development principles, subsisdies and tax incentives designed to achieve balaned regional development can result in uncomptetitive and excessively resource-consumptive industries. Government assistance programs, if used effectively, can contribute significantly to our efforts to protect the environment. Particularly in poorer regions, assistance programs can encourage adoption of new technologies, more efficient resource use and more effective environmental protection.

- **Full cost pricing of resources**. If Canadian resource firms are to be competitive and sustainable, they have to pay the full environmental costs of the resources they consume and they waste they produce. While it is difficult to assign monetary values to resources, it is recognized that not only should the cost of exploitation be accounted for as part of production cost, but also the cost of depletion. Many conferences, workshops and researches have been conducted in the field of ecological accounting.

- **The integration of environment and economics in decision-making**. As The Chairman of Dupont is fond of pointing out, the CEO of a company should be its Chief Environmental Officer. The BCNI statement quoted above goes further to say: "For the corporation, this will require leadership at the chief executive level and the adoption of a business-wide policy on sustainable development, including goals, objectives, performance targets for continuous improvement and monitoring systems, with a corresponding reward and reporting structure."[80]

This kind of integration must also take place in government policy making. If Sustainable Development is, in the words of BCNI, "the most important challenge facing Canadians", then governments must develop new ways to integrate the work of Ministries of the Environment, Finance and Industry to develop policies for competitiveness.

B Harmonization of Legislation

Just as the plethora of "green" regulations internationally make it difficult for firms to adapt their products to different markets, Canadian firms are often handicapped by the different standards and regulatory approaches adopted by different provinces. This could be an ideal role for CCME.

C Less Reliance on Command and Control Regulations

Experience has shown that regulations which specify how targets are to be achieved are often costly to implement and do not encourage innovation. Attention is turning to economic instruments which operate within pollution targets but which leave the choice of technology up to the individual firms. These instruments range from the familiar such as charges, deposit refund systems and taxes, to the more exotic such as tradable emissions permits and taxes on the use of virgin materials.

Economic instruments are created by legislation and regulation, but are differentiated from other regulations insofar by leaving more discretion to people to respond in ways judged by them to be for their greatest benefit. For example, a system of tradable permits for reduction of acid rain precursors with appropriate trading zones could provide firms with a basis for investment in new production facilities and technologies which will enhance competitiveness.

Several studies and articles have been written on the different instruments of environmental policy, the prominent ones being regulations (command and control instruments) and economic instruments (market-based instruments). While some tend to conclude that economic instruments are more effective, efficient and flexible, it is accepted that these instruments have their own advantages and disadvantages. Different environmental problems demand either one or a combination of the two.[81] In the discussion paper *Economic Instruments for Environmental Protection*, the Government of Canada concluded that in some cases "economic instruments could be preferable to traditional regulations" while in others "regulations may be the best approach."[82]

D The Development of High Standards in Selected Sectors

As pointed out earlier, a number of countries have used high performance standards as a way of encouraging technological innovation in their industrial sectors. Prominent amongst those are the energy efficiency standards adopted in Germany and Japan which have put German and Japanese industry in the forefront of energy conservation.

E The Need for Quick Action

The longer Canada waits to take action on a number of these problems, the more likely we are to spawn someone else's environmental industries than our own. As Sonnen has pointed out, the environmental industry sector in Canada is not well developed, with few distinguished exceptions. As Porter has pointed out, those companies which operate within the most rigorous markets tend to become the most competitive. If Canada wants an environmental protection industry, Canadian governments must be prepared to take a leadership role in some of these areas.

F The Need for International Leadership

The federal government and CCME should follow up the Prime Minister's call for a GATT round where the environment would be a focal point. Canada should also continue to play an active role in the development of an international forestry convention and in the further development of the Framework Convention on Climate Change.

A proactive strategy to promote international environmental cooperation and harmonization of standards could help to forestall green protectionism, which could have serious disruptive implications for Canadian industries. Participation in international environmental agreements establishing minimum standards for production processes would provide a more predictable planning context for Canadian firms and corporate decision-makers.

G Reconciling Environmental and Trade Measures

While international environmental cooperation may be the desirable way to address environmental issues, when there is no such agreement on environmental regulation and control, disputes may arise under international trade agreements. Thus, better approaches to managing the environmental aspects of trade disputes need to be developed.

Until recently, there have been very few trade disputes involving environmental issues -- apart from import restrictions for phytosanitary purposes where countries have had wide latitude to restrict imports. The tuna-dolphin dispute in the GATT is indicative of new concerns about the environmental impact of production processes outside the territory of the importing country.

Potential problems could arise from the conflict between the GATT obligation for Most-Favored Nation Treatment and recent international environmental agreements such as the Montreal Protocol on Ozone-Depleting Substances and the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes, which contain provisions for restrictions on trade with non-member countries. The conflict could arise from trade sanctions or restrictions imposed on countries who are not members of the international environmental agreement, but who are members of the GATT, because the GATT does not presently provide for such measures to be imposed, unless a waiver is obtained from the contracting parties. This potential issue could become more pressing in the future, as a result of, for example, extensions of the Montreal Protocol to a broader range of products involving fewer countries participating. More importantly, a future global warming convention involving significant reductions in CO_2 emissions would likely involve substantial sanctions against non-members.

The proposed NAFTA incorporates a number of suggestions that have been made for reconciling trade and sustainable development concerns in the Agreement. These provisions are likely to receive a great deal of attention in the U.S. Congress as part of the debate of NAFTA implementation.

A number of proposals have also been made to respond to environmental concerns through reform of the GATT. One obvious proposal is to include environmental experts on GATT dispute settlement panels. A more fundamental proposal is to incorporate a commitment to sustainable development in the proposed Multilateral Trade Organization proposed as part of the package to conclude the Uruguay Round of GATT negotiations. The issue of the relationship between international environmental agreements and trade agreements will need to be clarified in the future.

The linkages between environmental policies and objectives and competitiveness are complex. Setting high environmental goals may enhance competitiveness through innovation and stimulate environmental industries especially if the regulatory regimes in the OECD countries evolve in a similar manner. Developing common regulatory

approaches among Canadian jurisdictions will minimize the cost of regulatory compliance and serve to enhance competitiveness. As a relatively small economy heavily dependent upon exports, it is in Canada's interests to be proactive in promoting international environmental cooperation in order to create a more predictable climate for Canadian firms in developing investment and innovation strategies and in order to forestall trade disputes and green protectionism directed against Canadian exports.

ENDNOTES

1 Based on a November 1992 **Draft Report** on environmental regulations and the Canadian pulp and paper industry, British Columbia has set limits of 1.5 kg. by December 31, 1995 and the total elimination of AOX by the end of year 2002. These limits are being reviewed by the government with affected parties through a multi-stakeholder review process.

2 Porter is a professor of Business Administration at the Harvard Business School. He is an advisor to leading companies worldwide and has served on the President's Commission on Industrial Competitiveness.

3 Michael Porter and the Monitor Company Ltd., *Canada at a Crossroads - The Reality of a New Competitive Environment* (Canada: Business Council on National Issues and the Government of Canada, 1991), p.63.

4 United Nations Economic Commission for Latin America and Caribbean (ECLA), *Sustainable Development: Changing Production Patterns, Social Equity and the Environment* (Santiago, Chile: UN ECLA, 1991).

5 Office of Technology Assessment, Congress of the United States, *Trade and the Environment: Conflicts and Opportunities - Background Paper* (Washington, D.C., May 1992).

6 See "Trade and the Environment," in *International Trade*, 1990-1991 Volume 1 (Geneva: General Agreement on Tariffs and Trade, 1992) and OECD, "Joint Report on Trade and the Environment," COM/ENV/EC/TD (91) 14/Rev2 (Paris: OECD, May 14, 1991).

7 *Canada's Green Plan - Economic Instruments for Environmental Protection - Discussion Paper* (Government of Canada, 1992).

8 See GATT Annual Report, op. cit., p.31.

9 Michael Porter, "America's Green Strategy" in *Scientific American*, April 1991, p. 168.

10 McKinsey & Company, "The Corporate Response to the Environmental Challenge - A Summary Report" (Amsterdam, The Netherlands, August 1991).

11 Of the 400 respondents, 34 per cent were from companies based in western Europe, 11 were from Japan, and 17 per cent were based in North America. Close to half of

all responses were from a Chief Executive Officer/President or Board Member, with the remainder coming from very senior executives.

12 Hay Management Consultants, *Trends and Issues in Canada's Future*, Part I, March 1991.

13 Ibid.

14 OECD, *State of the Environment* (Paris: OECD, 1991). Refer in particular to a table on page 255 in Chapter 15.

15 *Ecodécision*, vol. 1 no. 1 (1991).

16 Carl Sonnen, "Moving Towards a Green Economy," Mimeo, Informetrica Ltd, Ottawa, April 1991.

17 The Office of Technology Assessment (OTA) noted that "26% of maquiladora operators in Mexicali cited the country's lax environmental enforcement as an important reason for relocation there. The U.S. General Accounting Office found that between 11 and 28 wood furniture manufacturers in the Los Angeles area relocated to Mexico between 1988 and 1990, taking with them 960 to 2,547 jobs. About 80% of the firms cited stringent air pollution standards as well as lower labor costs as major factors in their location decision. In Mexico, these firms faced no air pollution standards for the application of paint coatings and solvents." These citations were based on R. Sanchez, "Health and Environmental Risks of the Maquiladora in Mexicali," *Natural Resources Journal 30*, Winter 1990; S. Tolan, "Hope and Heartbreak," *The New York Times Magazine*, Best of Business Quarterly, Winter 1990-91; and the U.S. Congress, U.S. General Accounting Office, "U.S.-Mexico Trade: Some U.S. Wood Furniture Firms Relocated From Los Angeles Area to Mexico", April 1991.

18 Sierra Club Center for Environmental Innovation, "A Critique of GATT Secretariat Report on Trade and the Environment" (Washington, D.C., April 1992). Also refer to P. Low, "International Trade and the Environment: An Overview," in International Trade and the Environment World Bank Discussion Papers 159 (Washington, D.C., 1992) and J. Nicolaisen, A. Dean and P. Hoeller, "Economics and the Environment: A Survey of Issues and Policy Options," *OECD Economic Studies* No. 16 (Spring 1991).

19 S.C. Johnson and Sons, Inc. *Environmental Behaviour, North America: Canada, Mexico and the United States*, a Commission study undertaken by The Roper Organization Inc., July 1992.

20 In December 1985, the EC adopted the Council Directive Prohibiting Use in Livestock Farming of Certain Substances Having A Hormonal Action. This came into effect on January 1989 resulting in an EC ban on importations of all beef treated with growth hormones. The U.S. protested the adoption of the directive on the grounds that there was no scientific evidence with respect to the risks in the use of hormones, and, therefore, the ban was a barrier to trade. The EC countered that there is no scientific evidence that guarantees that beef treated with the hormone is totally risk free and that it should have the right to adopt precautionary bans to protect its own consumers. In retaliation, the U.S. increased its import tariffs on certain EC products. In February 1989, the U.S. and EC set up a bilateral Beef Hormone Task Force to settle the matter or to prevent the dispute from worsening. An interim measure was passed which allowed some U.S. beef imports and a reduction in additional duties imposed on certain EC products. (This summary was provided in Appendix A of *Trade and Environment - Conflicts and Opportunities*, Office of Technology Assessment, op.cit., pp. 86-87.)

21 GATT report, op.cit.

22 The U.S. banned importations of tuna under the U.S. Marine Protection Act which seeks to limit incidental killing or serious injury to dolphins and other marine mammals due to commercial fishing operations. The GATT panel ruled against the United States in that case. The panel decision was based on the following: First, the exceptions of Article XX (b) and (g) could not be used to justify trade restrictions based on another country's international regulations. More specifically, fishing by a vessel in international waters is governed by the domestic laws of vessel's flag country. Second, the exceptions applied only to the jurisdiction of the importing country and neither case applied to the dolphins which were outside the United States. Third, the U.S. action was not found necessary as required in subsection b of Article XX since other approaches to protecting the dolphins were available for use, such as an international agreement to limit dolphin catches. As of March 1992, the panel report had not been adopted by the GATT Council with the parties attempting to settle the case without a formal GATT decision. (Refer to analysis of the Office of Technology Assessment, op.cit., pp. 46-50.)

23 Office of Technology Assessment report, op.cit., particularly Appendix B.

24 See "The Use of Trade Provisions in International Environmental Agreements", prepared by James Cameron and Jonathan Robinson of the Centre for International Environmental Law (U.K.). The authors are consultants.

25 Recent research on internal barriers in Canada is reviewed by Murray Smith "Muddling Through is not Enough: A Survey of Global and Economic Challenges," in D. Brown and M.G. Smith, eds. *Canadian Federalism: Meeting Global Economic*

Challenges? (Kingston: Institute of Intergovernmental Relations and Halifax: Institute for Research on Public Policy, 1991).

26 In Michael Hart, *Trade Why Bother?* (Ottawa: Centre for Trade Policy and Law, 1992).

27 Based on statement of Senator Max Baucus "Protecting the Global Commons: The Nexus between Trade and Environmental Policies" delivered before the Institute for International Economics, Washington, October 1991.

28 In the former case, settlement of the dispute between U.S. and Canada was sought by Canada under the Free Trade Agreement. The dispute settlement panel agreed with the U.S. argument that minimum size requirements were an internal measure acceptable under Article III as it applied equally to domestic and foreign lobsters and was not a border measure targeted at imports. The report made an extensive legalistic examination of the terms and history of Articles III and IX which are incorporated in the FTA. No consideration was made of such environmental matters as the difference in water temperatures between U.S. and Canadian lobster grounds which determine the sexual maturity of lobsters. On the other hand, the dispute with respect to the tuna/dolphin case was submitted to a GATT panel which used Article XX as the basis for its review. See summary of Office of Technology Assessment, op.cit., pp. 88-89.

29 See Minutes of the Proceedings of the Subcommittee on International Trade of the Standing Committee on External Affairs and International Trade, *Issues 13*, for a discussion of environmental issues and the proposed NAFTA text.

30 The Agreement on Environmental Cooperation signed between Mexico and Canada pertains to a commitment to assist Mexico in improving its environmental monitoring and enforcement practices. Among the projects to be carried out with the help of both private and public sectors in both countries include compliance monitoring, management of hazardous substances and wastes, air pollution control and environmental impact assessment. As well, the program covers the development of projects on environmental education. (See *North American Free Trade Agreement - Canadian Environmental Review* (Government of Canada, October 1992).)

31 Ibid.

32 These were expounded by Gary Hufbauer and Jeffrey Schott in "Environmental Questions," *NAFTA: Issues and Recommendations* (Washington, DC: Institute for International Economics, 1992).

33 See *North American Free Trade Agreement - Canadian Environmental Review* (Government of Canada, October 1992).

34 This reference was used by Paul West and Paul Senez, *Environmental Assessment of the NAFTA - The Mexican Environmental Regulation Position*, a study prepared for the British Columbia Ministry of Economic Development, Small Business and Trade, January 1992.

35 Ibid. and Hufbauer and Schott, op.cit.

36 OECD. "Environment and Trade: Major Environmental Issues." (Paris: OECD, Environment Committee, 19 March 1991).

37 This was raised by S. Shrybman in "The International Trade and Environment (An Environmental Assessment of the Present GATT Negotiations), a paper with the Canadian Environmental Law Association (Toronto: CELA, March 1990).

38 These studies and findings were cited by J. Dean, "Trade and Environment: A Survey of the Literature" in International Trade and the Environment - World Bank Discussion Papers 159 edited by Patrick Low (Washington, D.C.: World Bank, 1992).

39 Ibid.

40 See Office of Technology Assessment, op.cit.

41 Ibid. Author also referred to H. Jeffrey Leonard, *Pollution and the Struggle for the World Product* (New York,NY: Cambridge University Press, 1988); Roberto Sanchez, "Health and Environmental Risks of the Maquiladora in Mexicali," *Natural Resources Journal*, vol. 30 (Winter 1990); U.S. General Accounting Office "U.S.-Mexico Trade: Some U.S. Wood Furniture Firms Relocated From Los Angeles Area to Mexico," April 1991; and T. Bartik, "The Effects of Environmental Regulation on Business Location in the United States, " in *Growth and Change*, summer 1988.

42 Charles S. Pearson, "Industrial Relocation and 'Pollution Havens'," *Economics of Environmental Protection* reprinted from *Economic Impact*, No. 65 (1989).

43 Ingo Walter, "Environmental Control and Patterns of International Trade and Investment," *Banco Nationale del Lavoro Quarterly Review*, vol. 25, No. 100, March 1972.

44 See OECD Joint Report of May 1991, op. cit.; R. A. Reinstein, "Trade and Environment" Draft Mimeo, July 26, 1991,

45 *Canada and the Earth Summit* Volume 1, No.5, Autumn 1992.

46 As of June 14, 1992, 153 states and the European Community signed the Convention. See *Environmental Policy and Law* 22, No. 4 (1992).

47 According to the 1975 and 1991 Annual Reports of the Food and Agriculture Organization, the Canadian market share (by value) in the world pulp and paper industry fell from 28% to 22% of world trade for the period 1970 to 1989. Further details on the Canadian pulp and paper industry are provided in a draft of a November 1992 report on environmental regulations and the Canadian pulp and paper industry.

48 Without going into detail, the issue is whether newsprint recycling requirements are consistent with GATT rules and obligations. Since recycled content is a product standard, it is arguable that the requirement is consistent with the requirement for national treatment under Article III of the GATT. (An analogous argument can be made in favour of Ontario's tax on beer cans.) Even if on careful examination the recycled content requirement was found inconsistent with Article III, the importing jurisdiction could still claim the measure was permitted under the Article XX exceptions. However, since newsprint has been exported duty-free into the United States for decades, Canada could argue that the recycled content requirement nullifies and impairs anticipated benefits, but it is difficult to be certain of the outcome of such a case. (This note is intended just as a sketch of some complex issues and is not a definitive treatment.)

49 See Jackson 1993 and Petersmann 1991 for a discussion of how environment and trade issues can be integrated.

50 See Andrew Thompson in *Getting It Green* edited by B. Doern (Toronto: C.D. Howe Institute, 1990). Also refer to A. Dorcey, M. McPhee and S. Smith, *Salmon Protection and the B.C. Coastal Forest Industry: Environmental Regulation as a Bargaining Process* (Vancouver: Westwater Research Centre, undated).

51 See Note 1.

52 A 4th R may be added and this refers to **recovery** of energy from wastes.

53 *Highlights from the Report: The Canadian Market for Environmental Products and Services* (Industry, Science and Technology Canada, 1991). This is based on an independent 1991 report from Ernst & Young.

54 **Dedicated environmental technology, products and services used by industry** mean environmental impact studies, laboratory services, membrane technology, aeration tanks, air monitoring equipment, and ultraviolet radiation equipment; **Multi-purpose technology, products and services** refer general engineering and construction services, water pumps, piping and valves; **Clean industrial processes** pertain to high-efficiency burners, closed-loop water systems, fuel-efficient engines

and electric arc furnaces, and **Environmentally-friendly consumer products and services** refer to refillable plastic containers, reusable skids and packaging, non-phosphate detergents, recycled paper, diaper services and environmentally-friendly lawn care.

55 Defined by Ernst and Young, "Study of the Ontario Environmental Protection Industry" A Report prepared for the Ontario Ministry of the Environment, June 1992, p.15.

56 Cited by Mr. Gilles Rhéaume, Vice President, Conference Board of Canada and Director of Business Research Program. He made a presentation before the House of Commons, Standing Committee on the Environment, June 1992, op.cit.

57 Ernst and Young, op.cit., p. 15.

58 *The OECD Environment Industry: Situation, Prospects and Government Policies*, OECD/GD (92) 1 (Paris: OECD, 1992).

59 *Highlights from the Report: The Canadian Market for Environmental Products and Services* (Industry, Science and Technology Canada, 1991), based on the March 1991 report of Ernst & Young.

60 The narrower focus in this ISTC definition is attributed to the fact that "the size and growth potential of the market for these industrial products and services present immediate business opportunities for the environmental industry." There are no accurate statistics on clean industrial processes but the best estimate is $3 billion annually.

61 ISTC Report, op.cit.

62 Ernst and Young, op.cit., pp.2-3.

63 Redma Consultants Limited, *The U.S. Opportunities for Ontario Environmental Protection Products and Services* (1990) and Ernst & Young, *Europe 1992 and the Ontario Environmental Protection Industry* (1990a).

64 Ernst and Young, op.cit, p.136.

65 S. Richardson, "Trade, the Environment and Competitiveness" Report to the National Round Table on the Environment and Economy, October 1991.

66 Gary Hufbauer and J. Schott, op.cit. They made reference to *Journal of Commerce* 25, October 1991 (1A).

67 Ernst and Young, op.cit., pp.143-145.

68 Westinghouse Electric Corporation Annual Report 1991, pp. 8-10,

69 S. Richardson, op.cit.

70 Cited by Office of Technology Assessment, op.cit., with reference to "Taiwan Firms to Buy Waste Treatment Equipment," *NewsACTION 6*, No. 1 (Spring 1991).

71 ECLA, op.cit.

72 Thomas D'Aquino, "Business Leadership and the Global Environmental Challenge," an address at the 24th International Congress of Actuaries, Montreal, June 1992.

73 See Focus 2000 - A Small Business Guide to Environmental Management, September 1991. It was prepared and written by Peat Marwick Stevenson Kellogg in partnership with the National Round Table on the Environment and Economy and the Canadian Chamber of Commerce.

74 "Ozone Depletion: Acting Responsibly." Report of the Standing Committee on Environment, Ottawa, June 1992.

75 "Report on the Environment" Globe and Mail, June 4, 1991, p. C1-8.

76 The Economist, op.cit.

77 See Stephan Schmidheiny (With Business Council on Sustainable Development), *Changing Course - A Global Perspective on Development and the Environment* (Cambridge, MA and London, England: MIT Press, 1992), p. 230.

78 In Sweden, new refrigerators consume an average of 1.4 kwh/liter. Older units average 2.0 kwh/liter.

79 Business Council on National Issues (BCNI) "Towards and Sustainable and Competitive Future", May 1992.

80 Ibid.

81 Also refer to OECD, *Environmental Policy: How To Apply Economic Instruments* (Paris: OECD, 1991) and *Economic Instruments for Environmental Protection* (Paris: OECD, 1989); Canada Green Plan, "Economic Instruments for Environmental Protection" Discussion Paper, 1992; "Trade and Environment", Study undertaken by

research team led by Dr. F. Schmidt-Bleek and Dr. H. Wohlmeyer for The International Institute for Applied Systems Analysis (IIASA) and the Austrian Association for Agricultural Research, Laxenburg, Austria, July 1991; and T. Muzondo, K. Miranda and A. L. Bovenberg, "Public Policy and the Environment: A Survey of the Literature," IMF Working Paper WP/90/56, Washington, D.C., June 1990.

82 See Note 7.